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NORTHEAST-MIDWEST STATES FEDERAL HYDROPOWER FINANCING AUTHORITY ACT

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ORIGINAL

HEARING

BEFORE THE

SUBCOMMITTEE ON WATER AND POWER

OF THE

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

NINETY-SEVENTH CONGRESS
SECOND SESSION

ON

S. 1918

A BILL TO ESTABLISH THE NORTHEAST-MIDWEST STATES FEDERAL HYDROPOWER FINANCING AUTHORITY

JULY 29, 1982

Publication No. 97-92

Printed for the use of the
Committee on Energy and Natural Resources

U.S. GOVERNMENT PRINTING OFFICE
98-920 O
WASHINGTON : 1982

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CONTENTS

Page

S. 1918 3

STATEMENTS

Cairo, Richard A., secretary, Susquehanna River Basin Commission 136

Dubrow, Morgan D., senior staff engineer, National Rural Electric Cooperative Association 125

Hanrahan, Edward J., Deputy Director, Office of Policy, Planning and Analysis, Department of Energy 96

Matson, William F., president, Great Lakes Electric Consumers Association, Harrisburg, Pa 104

McDowell, Michael, executive director, Committee on Power for the Southwest 130

Murkowski, Hon. Frank H., a U.S. Senator from the State of Alaska 1

Radin, Alex, executive director, American Public Power Association 116

Scranton, Hon. William W., III, Lieutenant Governor, Commonwealth of Pennsylvania 82

Specter, Hon. Arlen, a U.S. Senator from the State of Pennsylvania 16

APPENDIX

Additional material submitted for the record 141

NORTHEAST-MIDWEST STATES FEDERAL HYDROPOWER FINANCING AUTHORITY ACT

THURSDAY, JULY 29, 1982

U.S. SENATE,
SUBCOMMITTEE ON WATER AND POWER,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10:05 a.m., in room 3110, Dirksen Office Building, Hon. Frank H. Murkowski, presiding.

Present: Senator Murkowski.

Also present: Russell R. Brown, professional staff member; and Craig Gannett, counsel for the minority.

OPENING STATEMENT OF HON. FRANK H. MURKOWSKI, A U.S. SENATOR FROM THE STATE OF ALASKA

Senator MURKOWSKI. Good morning. The hearing before the Subcommittee on Water and Power of the Senate Committee on Energy and Natural Resources will come to order this morning, and we will take testimony of the administration and public witnesses on Senate bill 1918, legislation introduced by Senator Specter and Senator Riegle which would establish the Northeast-Midwest States Federal Hydropower Financing Authority. The Corps of Engineers' National Hydroelectric Power Study completed in 1979 identified 3,673 sites in the area with potential installed capacity of 34,000 megawatts.

Although the estimates do not take into account the probability of the site being developed, they do show the scope of the undeveloped resource nationwide.

Currently developed hydropower capacity is about 60,000 megawatts of which about half is federally owned. If enacted and funded at an adequate level, Senate bill 1918 would serve to promote the undeveloped hydro sites to the area. Cost estimates are difficult to come up with given the uncertainty of what sites would be developed. However, the rule of thumb can be applied in that expansion of existing developed capacity costs about $600 per kilowatt of installed capacity, and new sites can range up to $2,000 per kilowatt of installed capacity.

Hydroelectric development is a capital-intensive industry, and there have been many past efforts to encourage such development by offering tax consideration on investments or the sort of program which was included in the Public Utility Regulatory Policy Act of 1978. Such efforts were well received.

Some of our witnesses this morning are from out of town. I do appreciate your taking the time and expense to come and give the committee the benefit of your views. We will certainly do our best to accommodate you this morning.

I ask that the text of S. 1918 appear in the hearing record at this point. Also the hearing record will remain open for 2 weeks to allow submission of additional material for the record.

[The text of S. 1918 follows:]

97TH CONGRESS
1ST SESSION

S. 1918

To establish the Northeast-Midwest States Federal Hydropower Financing Authority.

IN THE SENATE OF THE UNITED STATES

DECEMBER 8 (legislative day, NOVEMBER 30), 1981

Mr. SPECTER (for himself and Mr. RIEGLE) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

---

A BILL

To establish the Northeast-Midwest States Federal Hydropower Financing Authority.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) this Act may be cited as the "Northeast-Midwest States Federal Hydropower Financing Authority Act".

(b) The Congress finds and declares that (1) the Northeast-Midwest States are encumbered by high energy costs, (2) it is in the national interest to initiate a national strategic hydropower capacity, (3) there is an untapped capacity for hydropower in many of the Northeast and Midwest States, and (4) regional coordination and planning of hydropower development in the Northeast-Midwest States is desirable.

SEC. 2. (a) Subject to the provisions of subsection (b) of this section there is created a body corporate by the name of the "Northeast-Midwest States Federal Hydropower Financing Authority" (hereinafter referred to as the "Corporation" and the "Authority"). The board of directors first appointed shall be deemed the incorporators.

(b) The incorporation shall be held to have been effected upon the Secretary of Energy, or his successor, having been notified in writing, by the Governors of not less than four eligible Northeast-Midwest States, of the desire of such States to acquire membership in the Northeast-Midwest States Federal Hydropower Financing Authority. Such notification shall contain such information, and be in such form as the Secretary shall by regulation prescribe. No State shall be eligible to participate in the Authority established by this Act if such State is geographically located outside of the Midwestern or Northeastern part of the United States and is situated wholly within the boundaries of a Federal power marketing authority. In any case in which only a part of a State is situated within a Federal power marketing authority, the Board of Directors of the Corporation shall establish such regulations as may be necessary to determine the allocation of assistance under this Act to such State for use by it in connection with projects to serve that part of such State not served by a Federal power marketing authority.

SEC. 3. (a) The Board of Directors of the Corporation (hereinafter referred to as the "Board") shall consist of each Governor of a member State or his delegate, and one member, to be appointed by the President, by and with the advice and consent of the Senate, who shall be Chairman.

(b) The term of office of the member appointed by the President shall be four years.

(c) Any member appointed by the President to fill a vacancy in the position of Chairman occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term.

(d) Vacancies in the Board, so long as there shall be two members in office, shall not impair the powers of the Board to execute the functions of the Corporation, and two of the members in office shall constitute a quorum for the transaction of the business of the Board.

(e) Members of the Board shall be reimbursed by the Corporation for actual expenses (including traveling and subsistence expenses) incurred by them in the performance of the duties vested in the Board by this Act.

(f) No Director shall have financial interest in any public-utility corporation engaged in the business of distributing and selling power to the public.

(g) The Board shall direct the exercise of all the powers of the Corporation.

SEC. 4. The Board shall appoint a President of the Corporation and such other officers as the Board shall determine necessary. The President of the Corporation shall appoint such managers, assistant managers, employees, attorneys, and agents as are necessary for the transaction of the business of the Corporation, fix their compensation, define their duties, and provide a system of organization to fix responsibility and promote efficiency. The President of the Corporation may be removed in the discretion of the Board.

SEC. 5. Except as otherwise specifically provided in this Act, the Corporation—

(1) shall have succession in its corporate name;

(2) may sue and be sued in its corporate name;

(3) may adopt and use a corporate seal, which shall be judicially noticed;

(4) may make contracts, as herein authorized;

(5) may adopt, amend, and repeal bylaws;

(6) may purchase or lease and hold such real and personal property as it deems necessary or convenient in the transaction of its business, and may dispose of any such personal property held by it;

(7) shall have such powers as may be necessary or appropriate for the exercise of the powers herein specifically conferred upon the Corporation; and

(8) may accept appropriations from the United States and reimburse the United States in accordance with agreements entered into between the United States and the Corporation.

SEC. 6. (a) Subject to the provisions of subsection (b), the Corporation is authorized, on such terms and conditions as the Board of Directors may prescribe, to make loans to member States, including political subdivisions thereof which are engaged in retail electric services, and power authorities of member States, rural electric cooperatives, interstate compact river commissions, and consumer-owned and stockholder-owned electric utilities which provide retail electric service, located within any State which is a member of the Authority for the purpose of enabling such State, subdivision, cooperative, commission, or utility to carry out hydropower development.

(b) Loans under this section shall not exceed 70 per centum of the initial total estimated costs of such hydropower development, as estimated by the Corporation as of the date of the loan or commitment to loan.

(c) Each loan made under this section shall bear interest at such rate as the Corporation may determine, giving consideration to the needs and capacities of the recipient and the prevailing rates of interest (public and private). Notwithstanding the preceding sentence, such rate shall not be less than a rate determined by the Secretary of the Treasury, for the Corporation, taking into consideration the current average yield on outstanding marketable obligations of the United States with remaining periods of maturity comparable to the average maturities of such loans. No loan shall be made unless the Corporation shall have determined that there is a reasonable prospect of repayment or that successful completion and operation of the hydropower development project will have a substantial value in helping to meet the energy needs of the Northeast and Midwest States.

(d) Loans made under this section may be made either directly or in cooperation or participation with banks or other lenders. Loans may be made directly upon promissory notes or other evidence of indebtedness or by way of discount or rediscount of obligations tendered for the purpose.

(e) If the Board of Directors determines that the borrower is unable to meet payments under a loan agreement and is not in default, it is in the public interest to permit the borrower to continue to pursue the purposes of the project, and the probable net benefit to the Corporation in forbearing from exercising its rights under a loan agreement will be greater than that which would result in the event of a default, and if the borrower agrees to make such payments to the Corporation on terms and conditions, including interest, which are satisfactory to the Corporation, then the Corporation may forbear from exercising its rights under the loan agreement.

(f) No loan under this section shall have a maturity date of more than thirty years or the useful life of the project involved, whichever is less.

SEC. 7. (a)(1) Subject to the limitations set forth in paragraph (2), the Corporation is authorized, on such terms and conditions (including the right of subrogation) as the Board of Directors may prescribe, to commit to, or enter into loan guarantees against loss of principal and interest on bonds, notes, or other obligations (including refinancing thereof) issued solely to provide funds to any member State, including political subdivisions thereof which are engaged in retail electrical services, and to any power authorities of member States, rural electric cooperatives, interstate compact river commissions, and consumer-owned and stockholder-owned electric utilities which provide retail electric services, located within any State which is eligible to participate in the Authority for the purpose of enabling such State, subdivision, cooperative, commission, or utility to carry out hydropower development projects.

(2) Loan guarantees under this section shall not exceed 70 per centum of the initial total estimated cost of any such project, as estimated by the Corporation as of the date of the guarantee or commitment to guarantee.

(3) The Corporation, in reviewing the need for financial assistance pursuant to applications for loan guarantees, shall consider whether the concern or concerns making such application otherwise would be unable, exercising prudent business judgment, as determined by the Board of Directors, to finance the project, taking into account among other factors, the availability of debt financing under normal lending criteria based on the assets associated with the project.

(4) Any loan guarantee made by the Corporation under this section shall not be terminated, canceled, or otherwise revoked, except in accordance with the terms thereof, and shall be conclusive evidence that such loan guarantee complies fully with the provisions of this section and of the approval and legality of the principal amount, interest rate, and all other terms of the securities, obligations, or loans and of the guarantee.

(b) If the Board of Directors determines that—

(1) the borrower is unable to meet payments and is not in default, it is in the public interest to permit the borrower to continue to pursue the purposes of such project, and the probable net benefit to the Cor-

poration in paying the principal and interest due under a loan guarantee agreement will be greater than that which would result in the event of a default;

(2) the amount of any payment which the Corporation would be required to pay shall be no greater than the amount of principal and interest which the borrower is obligated to pay at that time; and

(3) the borrower agrees to reimburse the Corporation for such payment on terms and conditions, including interest, which are satisfactory to the Corporation,

then the Corporation is authorized to pay the lender under a loan guarantee agreement an amount not greater than the principal and interest which the borrower is obligated to pay and which the Corporation has guaranteed under such agreement.

(c) No loan guaranteed under this section shall have a maturity date of more than thirty years or the useful life of the project involved, whichever is less.

SEC. 8. (a) The Corporation shall maintain its principal office in the immediate vicinity of Pittsburgh, Pennsylvania. The Corporation shall be held to be an inhabitant and resident of the western judicial district of Pennsylvania within the meaning of the laws of the United States relating to the venue of civil suits.

(b) The Corporation shall at all times maintain complete and accurate books of accounts.

(c) Each member of the Board, before entering upon the duties of his office, shall subscribe to an oath (or affirmation) to support the Constitution of the United States and to faithfully and impartially perform the duties imposed upon him by this Act.

SEC. 9. (a) The Board shall file with the President and with the Congress, in December of each year, a financial statement and a complete report as to the business of the Corporation covering the preceding governmental fiscal year.

(b) The Comptroller General of the United States shall audit the transactions of the Corporation at such times as he shall determine, but not less frequently than once each governmental fiscal year, with personnel of his selection. In such connection he and his representatives shall have free and open access to all papers, books, records, files, accounts, plants, warehouses, offices, and all other things, property, and places belonging to or under the control of or used or employed by the Corporation, and shall be afforded full facilities for counting all cash and verifying transactions with and balances in depositaries. He shall make a report of each such audit in quadruplicate, one copy for the President of the United States, one for the Chairman of the Board, one for public inspection at the principal office of the Corporation, and the other to be retained by him for the uses of the Congress. Such report shall not be made until the Corporation shall have had reasonable opportunity to examine the exceptions and criticisms of the Comptroller General or the General Accounting Office, to point out errors therein, explain or answer the same, and to file a statement which shall be submitted by the Comptroller General with his report. The expenses for each such audit shall be paid from any appropriation or appropriations for the General Accounting Office. Nothing in this Act shall be construed to relieve the Treasurer or other accountable officers or employees of the Corporation from compliance with the provisions of existing law requiring the rendition of accounts for adjustment and settlement pursuant to section 236 of the Revised Statutes of the United States, and accounts for all receipts and disbursements by or for the Corporation shall be rendered accordingly. Subject only to the provisions of this Act, the Corporation is authorized to make such expenditures and to enter into such contracts, agreements, and arrangements, upon such terms and conditions and in such manner as it may deem necessary, including the final settlement of all claims and litigation by or against the Corporation; and, notwithstanding the provisions of any other law governing the expenditure of public funds, the General Accounting Office, in the settlement of the accounts of the Treasurer or other accountable officer or employee of the Corporation, shall not disallow credit for, nor withhold funds because of, any expenditure which the Board shall determine to have been necessary to carry out the provisions of this Act.

(c) The Corporation shall determine its own system of administrative accounts and the forms and contents of its contracts and other business documents except as otherwise provided in this Act.

SEC. 10. Within one hundred and eighty days following the effective date of the Corporation as provided in section 2(b), or as soon thereafter as may be feasible, the United States Corps of Engineers, in coordination with the Power Marketing Administration of the Department of Energy, shall complete for each of the member States a study of hydroelectric power potential in the State with emphasis on priorities for those projects with the highest cost-benefit ratios. Such study shall include a review of the environmental consequences of each such project with the Environmental Protection Agency and the findings and recommendations of the Agency shall be included as a part of such study. In conducting each such study, the Corps of Engineers shall use, to the extent feasible, existing studies of Federal and State agencies, including but not limited to, the National Hydroelectric Power Resource Study. In conducting such study, the Corps of Engineers shall consult with each State agency designated by the appropriate Governor and with the interstate water resource commissions.

SEC. 11. No application for a loan under this Act shall be approved unless the Governor of the State in which the project to be developed by the proceeds of such loan has been notified in writing of the request for such loan, and then only if within the sixty-day period following the date of such notification, the Governor has not notified the Corporation, in writing, that he or she disapproves of such project within his or her State.

SEC. 12. There are authorized to be appropriated such sums as may be necessary to carry out the provisions of this Act.

Senator **Murkowski**. Do we have our first witness? We will wait just a moment until Senator Specter comes in.

[Brief pause in the proceedings.]

Senator **Murkowski**. Good morning, Senator.

Senator **Specter**. Good morning, Mr. Chairman.

Senator **Murkowski**. I believe that you have asked that the Honorable William W. Scranton III, the Lieutenant Governor from the State of Pennsylvania, join you?

Senator **Specter**. Yes, I have, Senator.

Senator **Murkowski**. We would be pleased to have the Honorable William Scranton here as a witness this morning with Senator Specter.

Senator **Specter**. He has been detained momentarily in the corridor on a television interview which is something which certainly does not take precedence over a committee hearing but is not an irrelevancy especially in an election year.

Senator **Murkowski**. I understand, Senator, and I want to assure you you can assure the Honorable William Scranton we will make an exception for television. You may be seated if you are more comfortable.

Senator **Specter**. Let me wait for the Lieutenant Governor to come. He should be here momentarily.

Senator **Murkowski**. I have made my opening statement, and in deference to those who are here I don't feel compelled to read it again, although I am disappointed that you missed it. I am sure you will read it in the record or staff will brief you. It was rather eloquent. Mr. Brown assisted me in the preparation, and I suppose it would be appropriate to acknowledge that, Mr. Brown.

I believe we are ready to proceed, and we have joining Senator Specter at the witness table the Honorable William Scranton III, Lieutenant Governor of the State of Pennsylvania, and I mentioned to Senator Specter that I had already read my opening remarks. I will not prevail upon the audience to go through them again, and I gave a brief description of the availability of hydropower in our country that is undeveloped at this time, and the potential for development, touched a bit on the financing, but I am sure in your statements you will both direct your attention to the rather tough set of circumstances prevailing in Washington with regard to Federal funding for projects of this type.

I appreciate your presence this morning and would ask that you begin in the order of your choice.

STATEMENT OF HON. ARLEN SPECTER, A U.S. SENATOR FROM THE STATE OF PENNSYLVANIA

Senator **Specter**. Mr. Chairman, permit me to start by expressing my appreciation to the subcommittee for scheduling this hearing in the busy calendar which you have, and to express my appreciation for your leadership, Senator Murkowski, on this important area.

The proposal which we are being heard on today relates to hydropower facilities, Federal Hydropower Financing Authority Act, a legislative proposal which has been developed through the efforts of the excellent staff of the Northeast-Midwest Alliance consisting of the Senators from some 18 of the States in the Northeast-Midwest section.

The area of hydropower has been developed nationally, but for some reason there has been no development in the Northeast and Midwest. I have submitted a statement which I would ask be inserted in the record in full.

Senator **Murkowski**. It will be inserted in the record.

Senator **Specter**. In accordance with the practices of this and other committees, I will summarize the highlights and then respond to the questions before introducing the distinguished Lieutenant Governor of the Commonwealth of Pennsylvania.

The Tennessee Valley Authority is perhaps the most famous of Federal efforts in this area. This along with five Federal power marketing authorities in other sections of the country give substance to the recognition of the Federal role in promoting regional economic development by helping provide inexpensive energy. The costs of energy today are astronomical, and it is not necessary to particularize the evidence in this field to illustrate the enormous costs as they have been increased as a result of the escalating price of OPEC oil.

The New England and Midwestern areas, Northeastern areas of our country, bear a disproportionate share of those energy costs. New England average household energy costs rose from $386 in 1970 to $1,325 in 1980, while in the West the cost rose from $263 in 1970 to $676 in 1980, so that there is a disparity with the East having twice the cost on an average household that is comparable in the West.

Petroleum accounts for 58 percent of the energy used in the residential section of Maine, and only 2 percent in Arizona. Over 80 percent of the electricity generated in Oregon and Washington comes from hydropower, whereas almost 80 percent of the electricity in Massachusetts and Rhode Island comes from petroleum which is certainly ample evidence of the need to correct this disparity, and yet at the same time the Army Corps of Engineers estimates that the States of the Northeast and Midwest contain half of the feasible hydro sites and 20 percent of the potential hydro generating capacity which exists in the country.

The Department of Energy has disclosed last year that "This power marketing study of the Great Lakes area reveals that about 3 million kilowatts of hydroelectric capacity could be installed at dams now operated by the U.S. Army Corps of Engineers in the area comprising all of the States of Illinois, Indiana, Michigan, Ohio, and Wisconsin, parts of Iowa, Minnesota, Pennsylvania, and West Virginia."

The operational aspect of this bill is set forth on page 4, and I think it important to note, Mr. Chairman, that last year on September 22 the Senate unanimously passed S. 306 which authorizes the Secretary of the Interior to construct, operate, and maintain specified hydroelectric powerplants and the necessary transmission facilities in the Western States of Montana, California, Idaho, and Wyoming.

There really has to be, Mr. Chairman, some greater recognition to the unique needs of the Northeast and the Midwest, and of course, you and I operate on the Senate floor day in and day out, and we see the kind of reciprocal issues of concern which arise. Your State of Alaska has been in need of some consideration on the development of the pipeline on the tax bill, and as you well know, whenever a bill is passed which has some special benefit for Alaska, as a Pennsylvania Senator, and I made this comment to you—you were well aware of it even before I mentioned it to you—there is a comment why Alaska with all the wealth of Alaska? And I respond to my constituents that it is a 50-State Nation and that Alaska has an enormous contribution to be made in many ways. It is undeveloped. Oil in Alaska has to be brought to the rest of the United States, and the natural gas, where while there are some costs which may have to be undertaken in the event some of those guarantees do not hold up, it is a national effort, and I think sometimes we lose sight in some of the regional friction or the regional competition between the Sunbelt and the Frostbelt that there is a need for more cooperation.

There has been I think a decisive tilt of power that has gone to the West, and it is remembered that a look at the composition of the Budget Committee in the U.S. Senate will show there are so little representation in the East, and this is a matter that we are all going to have to look at and try to bring some balance back to the Northeast and to the Midwest.

The legislation which is currently pending does not ask for, as S. 306 did, in contrast, S. 1918 does not ask for the involvement of any Federal agency in the construction of lowhead hydropower facilities in the Northeast-Midwest States. Instead it authorizes States which are now serviced by Federal power marketing authorities to voluntarily form a Northeast-Midwest States Hydropower Financing Authority with the representative of the President who shall be chairman. Loan and loan guarantees will be available to cover the percent of the costs of installation of lowhead hydropower development at the cost of borrowing to the Treasury.

It is postulated, Mr. Chairman, that there will be no cost to the Federal Government in the long run. It is our urgent request that this legislation be expeditiously processed for action on the floor because this really just sets the stage. Before there is any cost at all to the Federal Government there will have to be authorizing legislation, and then there will have to be appropriations legislation, but we should not wait before an accomplishing of the laying of the foundation so that we can move ahead, and I am optimistic that things will not always be quite as tough as they are at the present time.

You and I, Mr. Chairman, have come to the Senate at a time with enormous problems of the budget, more acute problems in the budget than at any time in the 200-year history of this country, and I am optimistic that there will be an economic recovery as the President has projected and that there will be a stimulus to the economy and there will come a day during the terms of Senators Murkowski and Specter when we will not have to have such tough budgetary constraints, and should that occur by 1983, 1984, 1985, or maybe even 1986 since we have substantial longevity in our existing terms, I would hope that this legislation would be in place so that we could return to this committee at a later stage and talk about authorization so that then the committee, this matter could come before the Appropriations Committee on which I sit. After authorization was enacted we could talk about appropriations, but none of that can be done unless this groundwork is laid, and that is why I am so anxious to see it pursued and so grateful to you, Mr. Chairman, for taking the time to hold these hearings in your very busy schedule.

[The prepared statement and additional documents submitted by Senator Specter follow:]

STATEMENT BY SENATOR ARLEN SPECTER BEFORE THE SUBCOMMITTEE ON POWER AND WATER OF THE SENATE COMMITTEE OF THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES ON S. 1918, THE NORTHEAST-MIDWEST STATES FEDERAL HYDROPOWER FINANCING AUTHORITIES ACT

July 29, 1982

Mr. Chairman,

I appreciate this hearing on S. 1918 the Northeast-Midwest States Federal Hydropower Financing Authorities Act. I know that the chairman of this subcommittee does not need to be told the importance of hydropower as a source of energy.

In addressing the need for this legislation, I would like to first briefly identify the economic situation in the older, industrialized states of the Northeast and Midwest. I believe it is important to underscore the tremendous influence that higher energy costs have had on the cost of doing business, and living, in the Northeast-Midwest region. To the degree that S. 1918 promotes the maximum use of our region's indigenous energy resources, such as small-scale hydropower, and lessens our dependence on expensive and imported oil, this legislation can be seen as an important tool in revitalizing the region's beleagured economy.

While, the entire country suffers from a troublesome recession, the northeast and even more the midwest are more critically hit than other areas of the country. In June 1980, the New York Times reported:

> "hampered by a population that is growing older, but not larger, the northeastern United States probably faces a continuation of the economic problems that have plagued it in recent years, according to government and private demographers who have studied 1980 census figures.

> Although those interviewed interpreted the figures with various degrees of alarm, all agree that the northeast, had little immediate prospects for improving its economic standing, both in absolute terms and in comparison with the healthier south and west. Some predicted extreme economic stress in coming years."

Over a year ago, Forbes magazine, in an article entitled "Trouble in the Heartland", observed "the Midwest, like New England long ago, is in a long industrial decline." The same article quoted the head of Stanford University's Graduate School of Business and former CEO of the Dana Corporation as saying, with respect to the Midwest regional economy, "It scares me.... it's much worse than most people think". The Forbes March 1981 article went on to say:

> Some of the fundamentals at work -- the long drift of capital, jobs and people from the Heartland to what's become known as the Sunbelt -- are familiar enough. On top of that came the energy crisis, putting the midwestern states with their cold winters at a further disadvantage compared with warmer states to the south and west. But compounding these woes now, so suddenly that few yet comprehend it, is the likelihood that when the Heartland's key industries recover -- autos, steel and the metalworking trades that go with them -- a large fraction of the jobs these industries used to provide, perhaps as many as a fourth of the jobs in some cases, will have disappeared. That means that when the national slump is over, the Midwest will still be in trouble.

The Northeast-Midwest Institute concluded earlier this year the "Population loss, high living costs, structural unemployment, low growth nature of business investment and soaring energy prices are but a few of the signposts marking the region's difficult road ahead.

While New England may not be quite as economically troubled as the Midwest, it is particularly hard hit by high energy costs. By any measure one chooses, the Northeast pays more in energy bills than any other area. New England's average household energy cost rose from $386 in 1970 to $1,325 in 1980; in the West the cost rose from $263 in '70 to $676 in '80. The State of Washington, which is serviced by the Bonneville Power Administration, is blessed with the lowest residential energy costs in the nation. In 1980, residents of my own State of Pennsylvania spent 227 percent more on home energy costs than did households in Washington State. Similar patterns exist in the commercial and industrial sectors.

Furthermore, the energy sources differ from region to region. Petroleum accounts for 58% of the energy used in the residential sector in Maine and only 2% in Arizona. Over 80% of the electricity generated in Oregon and Washington comes from hydropower, whereas almost 80% of the electricity in Massachusetts and Rhode Island comes from petroleum. Yet, the fact is the Northeast-Midwest has an abundant, but largely unused, source of energy in its waterpower. The Army Corps of Engineers estimates that the states of the Northeast and Midwest contain half of the feasible hydro sites and 20% of the potential hydro-generating capacity in the country. Yet, despite the real potential of small-scale hydropower to reduce high energy costs and our dependence on foreign oil, it remains a largely untapped resource in our region.

Mr. Chairman, on September 22, 1981 the Senate passed unanimously S. 306 which authorized the Secretary of the Interior to construct, operate and maintain specified hydroelectric power plants and the necessary transmission facilities in the Western states of Montana, California, Idaho and Wyoming. According to the Congressional Budget Office's budget impact statement to the committee report, $312.7 million of outlay were involved between 1982 and 1986. We understand, of course, that at some time in the future, as revenues are returned to the Treasury, these funds will be recouped, unless drought conditions are encountered.

In contrast, S. 1918 does not ask for the involvement of any federal agency in the construction of low head hydropower facilities in the northeast midwest states. Instead it authorizes states which are not now serviced by federal power marketing authorities to voluntarily form a northeast-midwest states hydropower financing authority with a representative of the President, who shall be chairman. Loan and loan guarantees will be available to cover 70 percent of the costs of installation of low head hydropower development -- at the cost of borrowing to the Treasury.

It should be noted under S. 1918 that Congress will have two further reviews before funds could be loaned or loan guarantees provided, during the authorization and appropriations process. Furthermore, the U. S. Army Corps of Engineers, in coordination with the Power Market Administration would complete for each member state a review of available hydropower sites. This would provide a sound basis for proceeding. It is intended that the massive National Hydroelectric Power Resources Study, completed recently by the Corps of Engineers, would serve as a data base for the Corps studies.

Mr. Chairman, a draft study by the U. S. Department of Energy in 1981 concluded that:

> This power marketing study of the Great Lakes Area reveals that about 3 million kilowatts (KW) of hydroelectric capacity could be installed at dams now operated by the U.S. Army, Corps of Engineers (Corps) in the area comprising all of the States of Illinois, Indiana, Michigan, Ohio, and Wisconsin, and parts of Iowa, Minnesota, Pennsylvania, and West Virginia. After allowing for sharing the output of plants that are on the border with adjacent power market areas, more than 2 million KW still remain available to help meet electric loads of the nine-State area.

The study went on to conclude that:

> This study supports the general conclusion that the hydroelectric potential at existing navigation and flood control projects in the Great Lakes area can be readily marketable. A recent sampling of the attitudes of specific preference customers in Iowa, Illinois, Indiana, Ohio, Michigan, and Wisconsin discloses that they are willing to commit themselves now to the purchase of such generation based on preliminary estimates of power costs developed by the National Hydroelectric Power Study. Development of this renewable resource could help reduce the energy needs of the area and significantly reduce the Nation's dependency on foreign oil -- up to 20,000,000 barrels of oil annually.

Of the 251 projects listed in the Corps' preliminary inventory of potential hydropower projects in Pennsylvania, 42 are operated by the Corps of Engineers. The undeveloped potential of the Corps' projects is 1,308 MW, which is about a quarter of the total undeveloped potential of 4,976 MW.

As the Director of Power and Water resources in the Department of Energy wrote to a member of my staff on October 16 of last year, "one can readily recognize that there is ample opportunity for both Federal and non-Federal interests to develop hydropower potential in your state."

Some may argue today that sufficient financial incentives are already in place to encourage the development of hydropower and this legislation, therefore, may be unnecessary. In response, I want to point out that the loan and loan guarantee program authorized under Title IV of PURPA will be terminated this year, the tax credits for small scale hydro are scheduled to be phased out in 1985, and the advantageous provision requiring utilities to purchase hydropower at "avoided cost" is under court challenge. In short, all those incentives may shortly evaporate. Furthermore, FY '83 will see the close-out of the Department of Energy's Small Scale Hydro office.

Mr. Chairman, the Federal Government through the creation of the Tennessee Valley Authority and the five Federal Power Marketing Authorities in other sections of our country has recognized its role in promoting regional economic development by helping provide inexpensive energy. The Congress has clearly responded to the energy needs of the rest of the nation. I am not prepared to argue that the passage of S. 1918 will solve all the economic problems of the Northeast and Midwest. I am prepared to argue that it will inevitably impact favorably on energy costs and to some degree facilitate economic development and survival in the Northeast-Midwest area. I believe that the Federal Government has the responsibility to do no less for the economically depressed Northeast-Midwest region of America than it has done from time to time for other areas with similar economic development problems. A draft issue brief by the Congressional Research Service of the Library of Congress states that the Pacific Northwest and the Northeast have the greatest installed capacity as well as the greatest potential capacity as well as greatest potential for future developments of small scale hydro. I urge committee approval of S. 1918.

The last decade was witness to a quadrupling of national expenditures for energy. Development of our potential hydroelectric generating capacity could reduce our nation's dependency on petroleum by up to 20 million barrels per year. For the energy-consuming dependent states of the Northeast and Midwest, economic necessity dictates that we pursue all available and feasible options. Given the opportunities presented by hydropower development, I hope you will join me in supporting this important legislation.

TABLE 2. PRELIMINARY INVENTORY OF HYDROELECTRIC POWER RESOURCES
REGIONAL STATE SUMMARIES
VOL 4: LAKE CENTRAL

STATE	EXISTING,[1] POTENTIAL INCREMENTAL[2] AND UNDEVELOPED[3] CAPACITY RANGES												TOTAL			
	Small-Scale (.05-15 MW)				Intermediate (15-25 MW)				Large-Scale (Greater Than 25 MW)				(All Sizes)			
	Exist	Incre	Undev	Total	Exist	Incre	Undev	Total	Exist	Incre	Undev	Total	Exist	Incre	Undev	Total
Illinois																
No. of Sites	16	39	230	285	0	8	0	8	1	7	2	10	17	54	232	303
Cap. (MW)	100	52	169	321	0	145	0	145	32	533	89	654	132	730	259	1121
Ener (GWH)	569	109	411	1,089	0	347	0	347	15	1,750	178	1943	584	2,206	589	3,379
Indiana																
No. of Sites	4	30	45	79	0	2	0	2	0	0	3	3	4	32	48	84
Cap. (MW)	28	58	61	147	0	37	0	37	0	0	383	383	28	96	444	568
Ener (GWH)	98	189	162	449	0	90	0	90	0	0	816	816	98	279	978	1,355
Iowa																
No. of Sites	3	25	37	65	0	1	0	1	1	12	3	16	4	38	40	82
Cap. (MW)	7	28	67	102	0	21	0	21	128	1,068	190	1,386	135	1,117	257	1,509
Ener (GWH)	36	81	200	317	0	39	0	39	805	3,468	408	4,681	841	3,588	608	5,037
Kentucky																
No. of Sites	0	52	23	75	0	2	0	2	4	30	10	44	4	84	33	121
Cap. (MW)	0	64	51	115	0	48	0	48	636	9,159	3,985	13,780	636	9,271	4,036	13,943
Ener (GWH)	0	183	121	304	0	88	0	88	2,259	24,547	11,697	38,503	2,259	24,818	11,819	38,896
Michigan																
No. of Sites	86	136	0	222	3	6	0	9	3	4	0	7	92	146	0	238
Cap. (MW)	283	303	0	586	52	121	0	173	151	709	0	860	486	1,133	0	1,619
Ener (GWH)	1,145	1,238	0	2,383	312	399	0	711	438	2,735	0	3,173	1,895	4,371	0	6,266
Minnesota																
No. of Sites	18	97	45	160	0	5	6	11	1	12	17	30	19	114	68	201
Cap. (MW)	91	63	146	300	0	100	125	225	67	825	755	1,647	158	989	1,027	2,174
Ener (GWH)	536	191	492	1,219	0	288	314	602	318	1,868	1,602	3,788	854	2,346	2,408	5,608

27

TABLE 2. PRELIMINARY INVENTORY OF HYDROELECTRIC POWER RESOURCES
REGIONAL STATE SUMMARIES
VOL 4: LAKE CENTRAL (Continued)

STATE	EXISTING,[1] POTENTIAL INCREMENTAL[2] AND UNDEVELOPED[3] CAPACITY RANGES												TOTAL			
	Small-Scale (.05-15 MW)				Intermediate (15-25 MW)				Large-Scale (Greater Than 25 MW)				(All Sizes)			
	Exist	Incre	Undev	Total	Exist	Incre	Undev	Total	Exist	Incre	Undev	Total	Exist	Incre	Undev	Total
Missouri																
No. of Sites	2	31	93	126	1	2	8	11	4	9	17	30	7	42	118	167
Cap. (MW)	5	22	227	254	16	45	154	215	577	1,301	868	2,746	598	1,368	1,249	3,215
Ener (GWH)	17	61	643	721	94	88	357	539	1,272	4,154	1,739	7,165	1,383	4,303	2,740	8,426
Ohio																
No. of Sites	0	68	18	86	0	7	0	7	0	2	1	3	0	77	19	96
Cap. (MW)	0	105	47	152	0	153	0	153	0	56	43	99	0	314	90	404
Ener (GWH)	0	308	131	439	0	323	0	323	0	134	70	204	0	768	201	969
Wisconsin																
No. of Sites	75	123	60	258	6	10	2	18	3	12	6	21	84	145	68	297
Cap. (MW)	220	219	158	597	112	205	40	357	98	387	239	724	429	812	437	1,678
Ener (GWH)	1,038	768	699	2,505	534	462	92	1,088	368	858	870	2,096	1,940	2,087	1,661	5,688
Region Total																
No. of Sites	204	601	551	1,356	10	43	16	69	17	88	59	164	231	732	626	1,589
Cap. (MW)	734	914	926	2,574	180	875	319	1,374	1,689	14,038	6,552	22,279	2,602	15,830	7,799	26,231
Ener (GWH)	3,439	3,128	2,859	9,426	940	2,124	763	3,827	5,475	39,514	17,380	62,369	9,854	44,766	21,004	75,624

TABLE 2. PRELIMINARY INVENTORY OF HYDROELECTRIC POWER RESOURCES
REGIONAL STATE SUMMARIES
VOL 6: NORTHEAST

STATE	EXISTING,[1] POTENTIAL INCREMENTAL[2] AND UNDEVELOPED[3] CAPACITY RANGES												TOTAL			
	Small-Scale (.05-15 MW)				Intermediate (15-25 MW)				Large-Scale (Greater Than 25 MW)				(All Sizes)			
	Exist	Incre	Undev	Total	Exist	Incre	Undev	Total	Exist	Incre	Undev	Total	Exist	Incre	Undev	Total
Connecticut*																
No. of Sites	13	205	NA	218	0	0	NA	0	2	0	NA	2	15	205	NA	220
Cap. (MW)	36	88	NA	124	0	0	NA	0	68	0	NA	68	103	88	NA	191
Ener (GWH)	156	308	NA	464	0	0	NA	0	216	0	NA	216	372	308	NA	680
Delaware																
No. of Sites	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2	2
Cap. (MW)	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2	2
Ener (GWH)	0	0	6	6	0	0	0	0	0	0	0	0	0	0	6	6
Maine*																
No. of Sites	33	469	NA	502	3	1	NA	4	2	2	NA	4	38	472	NA	510
Cap. (MW)	147	284	NA	431	58	20	NA	78	148	64	NA	212	354	369	NA	723
Ener (GWH)	881	992	NA	1,873	388	67	NA	455	507	226	NA	733	1,776	1,285	NA	3,061
Maryland																
No. of Sites	2	15	7	24	0	1	0	1	1	4	2	7	3	20	9	32
Cap. (MW)	2	18	20	40	0	19	0	19	474	496	232	1,202	476	532	252	1,260
Ener (GWH)	14	50	58	122	0	41	0	41	1,719	650	550	2,919	1,733	741	608	3,082
Massachusetts*																
No. of Sites	23	301	NA	324	2	0	NA	2	4	0	NA	4	29	301	NA	330
Cap. (MW)	73	115	NA	188	33	0	NA	33	131	0	NA	131	237	115	NA	352
Ener (GWH)	313	403	NA	716	176	0	NA	176	154	0	NA	154	643	403	NA	1,045
New Hampshire*																
No. of Sites	24	541	NA	565	2	1	NA	3	2	0	NA	2	28	542	NA	570
Cap. (MW)	74	238	NA	312	31	23	NA	54	281	0	NA	281	386	261	NA	647
Ener (GWH)	359	836	NA	1,195	180	82	NA	262	558	0	NA	558	1,097	918	NA	2,015
New Jersey																
No. of Sites	2	36	0	38	0	1	0	1	0	0	5	5	2	37	5	44
Cap. (MW)	6	21	0	27	0	23	0	23	0	0	647	647	6	40	647	693
Ener (GWH)	18	58	0	76	0	56	0	56	0	0	1,821	1,821	18	114	1,821	1,953

TABLE 2. PRELIMINARY INVENTORY OF HYDROELECTRIC POWER RESOURCES
REGIONAL STATE SUMMARIES
VOL 6: NORTHEAST (CONTINUED)

STATE	EXISTING,[1] POTENTIAL INCREMENTAL[2] AND UNDEVELOPED[3] CAPACITY RANGES												TOTAL			
	Small-Scale (.05-15 MW)				Intermediate (15-25 MW)				Large-Scale (Greater Than 25 MW)				(All Sizes)			
	Exist	Incre	Undev	Total	Exist	Incre	Undev	Total	Exist	Incre	Undev	Total	Exist	Incre	Undev	Total
New York																
No. of Sites	123	251	43	417	11	15	11	37	9	40	11	60	143	306	65	514
Cap. (MW)	422	657	148	1,227	216	309	226	751	3,103	11,491	2,754	17,348	3,741	12,458	3,127	19,326
Ener (GWH)	2,155	2,250	539	4,944	799	976	563	2,338	20,581	70,227	17,211	108,019	23,535	73,453	18,313	115,301
Pennsylvania																
No. of Sites	0	138	58	196	0	6	4	10	4	19	26	49	4	163	88	255
Cap. (MW)	0	158	189	347	0	107	79	186	403	1,466	2,977	4,846	403	1,731	3,245	5,379
Ener (GWH)	0	452	567	1,019	0	252	170	422	1,681	3,618	6,969	12,268	1,681	4,322	7,706	13,709
Rhode Island*																
No. of Sites	2	105	NA	107	0	0	NA	0	0	0	NA	0	2	105	NA	107
Cap. (MW)	2	40	NA	42	0	0	NA	0	0	0	NA	0	2	40	NA	42
Ener (GWH)	6	139	NA	145	0	0	NA	0	0	0	NA	0	6	139	NA	145
Vermont*																
No. of Sites	44	155	NA	199	1	0	NA	1	2	0	NA	2	47	155	NA	202
Cap. (MW)	106	134	NA	240	16	0	NA	16	74	0	NA	74	197	134	NA	331
Ener GWH)	436	472	NA	908	70	0	NA	70	317	0	NA	317	822	472	NA	1,294
W. Virginia																
No. of Sites	4	15	33	52	0	1	5	6	1	20	14	35	5	36	52	93
Cap. (MW)	46	18	132	196	0	23	95	118	102	2,929	958	3,989	148	2,969	1,184	4,301
Ener (GWH)	282	49	361	692	0	59	205	264	543	7,177	2,059	9,779	825	7,285	2,624	10,734
Region Total																
No. of Sites	270	2,231	143	2,644	19	26	20	65	27	85	58	170	316	2,342	221	2,879
Cap. (MW)	914	1,771	491	3,176	354	524	400	1,278	4,784	16,446	7,568	28,798	6,053	18,737	8,457	33,250
Ener (GWH)	4,620	6,009	1,531	12,160	1,613	1,533	938	4,084	26,276	81,898	28,610	136,784	32,508	89,440	31,078	153,025

[1] Existing hydroelectric power facilities currently generating power.

[2] Existing dams and/or other water resource projects with the potential for new and/or additional hydroelectric capacity.

[3] Undeveloped sites where no dam or other engineering structure presently exists.

*Data on undeveloped sites in the New England states are not available (NA).

NATIONAL AND STATE ENERGY EXPENDITURES 1970 - 1980

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July 1981

The research forming the basis for this report is
being conducted under a contract with the
U.S. Department of Housing and Urban Development.
The substance of such research is dedicated
to the public. The authors are solely responsible for
the accuracy of statements or interpretations contained herein.

THE NORTHEAST-MIDWEST INSTITUTE

The last several years have marked an increasing recognition that the future of the Northeast and Midwest, America's traditional industrial heartland, is of critical importance to the nation. It was not until the severe recession of the early and mid-1970s that political, business, and community leaders in the region began to acknowledge how far its once-vigorous economy had slipped.

The mounting evidence of this economic shift away from Northeastern and Midwestern states moved members of Congress, governors, state legislators, business and labor leaders, and others to organize for study and common action.

Formed in September 1976, the Northeast-Midwest Congressional Coalition is a bipartisan organization of 213 representatives from 18 states in the region. The Coalition's 35-member steering committee is headed by four officers: Representative Robert W. Edgar (D-Pa.), chairman; and Representatives Frank Horton (R-N.Y.), James L. Oberstar (D-Minn.), and Silvio O. Conte (R-Mass.), co-chairmen. The Northeast-Midwest Senate Coalition, formed in 1978, is chaired by Senators Donald W. Riegle, Jr. (D-Mich.) and Arlen Specter (R-Pa.).

These Northeast-Midwest coalitions in the House and Senate seek to inform their members about the regional implications of national policies and proposals, and to influence those issues of greatest importance to states in the region.

The Northeast-Midwest Institute -- an independent, nonprofit research center -- was developed to analyze the common problems of the region and to seek realistic solutions, particularly through congressional and administrative initiatives. While the 249 members of Congress represented in the House and Senate coalitions are key clients of its work, the Institute makes its findings available to governors and other elected officials, leaders of business, labor, and industry, and the public.

The Institute neither seeks nor encourages confrontations with other regions of the nation. In the Institute's view, economic problems of the regions must be addressed in the context of national policy because continued decline in one region undermines the economic health and vitality of the entire nation.

The Northeast-Midwest Congressional Coalition and the Northeast-Midwest Senate Coalition represent these state delegations: Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, and Wisconsin.

Tom Cochran, Executive Director

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INTRODUCTION

The fact of rising energy prices is common knowledge to everyone who drives a car or pays household, industrial, or commercial energy bills. But the total price tag on energy consumption never has been public knowledge. The information presented in this report shows energy use and cost by sector and state for the decade 1970-1980. It is based on the lastest available data provided by the Energy Information Administration of the U.S. Department of Energy.

The increase in size and percentage of national energy spending over the past decade -- the era of OPEC and decontrol -- has been formidable. In 1970, before OPEC became a household word, the United States paid $83 billion for energy. In 1980, energy spending was $387 billion. This represented a 141 percent increase (using constant dollars), outstripping the decade's inflation rate of 94 percent and the small 37 percent increase in real personal income.

Four sectors -- industrial, commercial, residential, and transportation -- are examined in this report. Among the most significant conclusions to emerge from the data:

- Transportation consumed more energy dollars than any other sector, adding up to 45 percent of the total energy expenditures in 1980. During that one year, it cost the United States almost twice as much for the energy needed to move people and things ($178 billion) as the total energy spending for industrial production ($90 billion) or the entire U.S. defense budget ($140 billion). Spending for residential energy was $73 billion. For the commercial sector, the total was $56 billion.

- Households in the Northeast and Midwest paid the highest energy bills in the country. For New England residents, the average home energy bill was $1,325 in 1980, an almost three-fold increase over the 1970 average bill of $386. In the Midwest, household energy costs jumped from $367 in 1970 to $1,150 in 1980. Home energy bills were lowest in the West, averaging only $676 in 1980. But significant variations could be found in most regions. South Dakota's household energy prices, for example, were among the highest in the nation, increasing from an average of $441 in 1970 to $1,164 in 1980.

- In 1980, energy prices for industry and transportation were lowest in the South, a powerful incentive for new industry.

- There were wide differences in the average price of industrial energy both between and within the regions. In 1970, for example, the average Western price of industrial energy ranged from a high of $1,331 per billion BTUs in South Dakota to $421 in Washington state. In 1980, the range among Western states was $1,452 to $4,471. In the Northeast, the range was $5,150 to $3,167.

Methodology

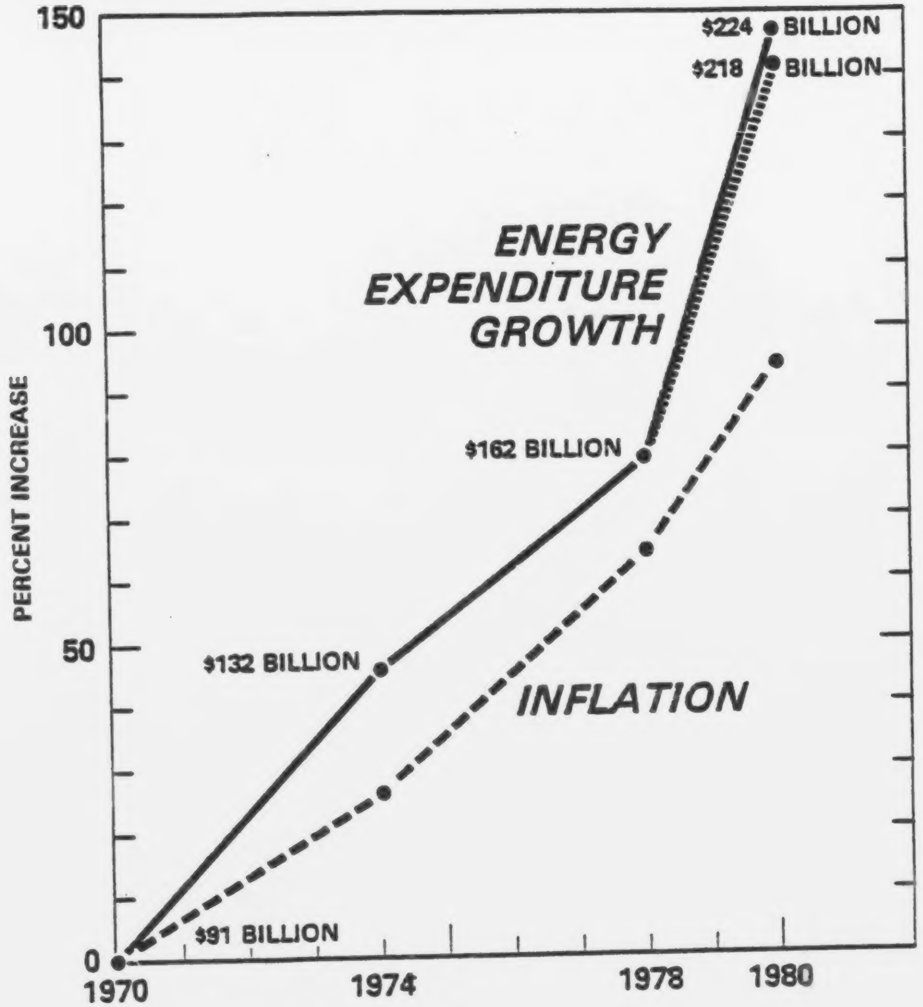
The 1970 and 1978 total energy expenditures were compiled by aggregating state-level information on energy use and cost for those years. 1978 is the last year for which the Energy Information Administration has published consumption data. To calculate the total U.S. energy bill for 1980, 1978 consumption figures were multiplied by 1980 state-level prices. The result was a national energy bill of $396.8 billion. However, the Energy Information Administration estimates that national energy consumption dropped by 2.5 percent from 1978 to 1980. To estimate the dollar savings represented by reduced consumption, the Northeast-Midwest Institute factored the decrease into the 1980 national average price of energy. The result showed that the 2.5 percent decrease in consumption saved an estimated $9.9 billion in 1980.

NATIONAL ENERGY EXPENDITURES

(BILLIONS OF DOLLARS)

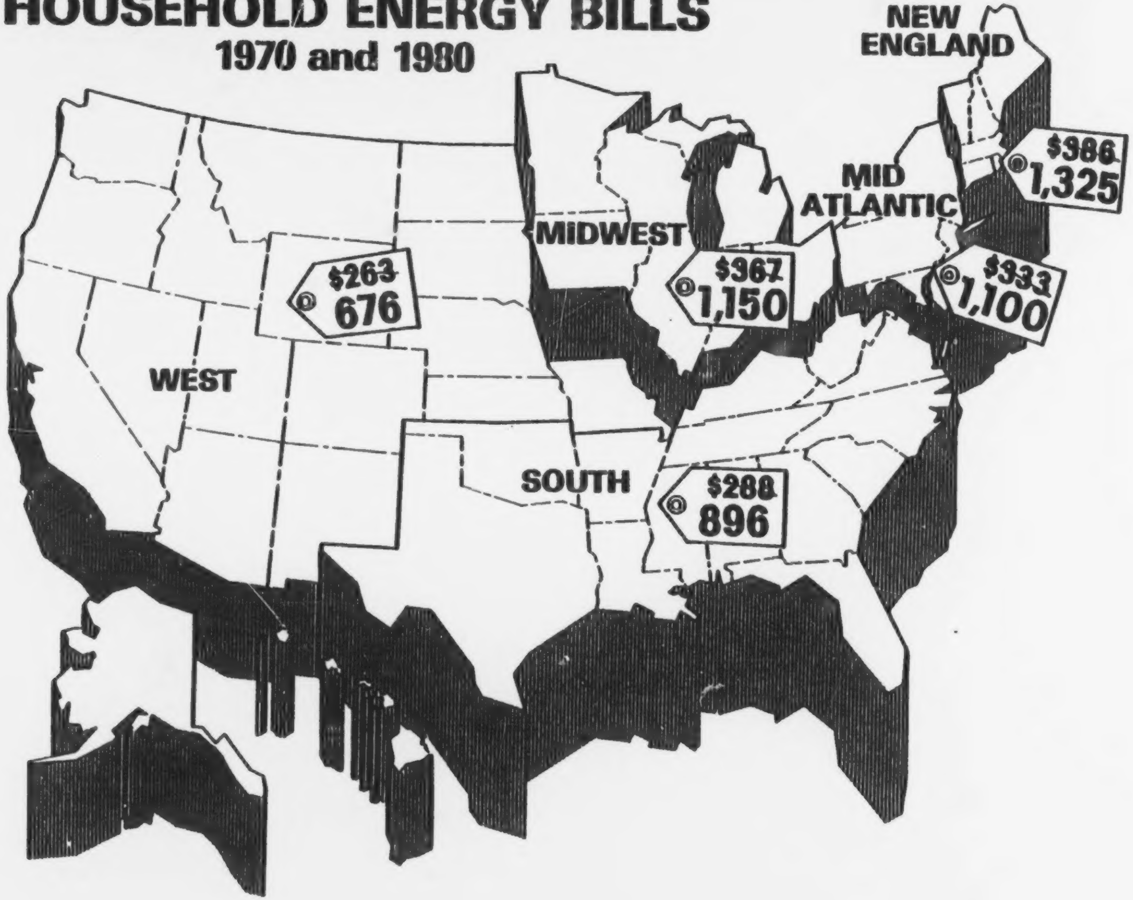
1970	TRANSPORTATION	$ 35.9
	RESIDENTIAL	19.8
	INDUSTRIAL	15.3
	COMMERCIAL	11.7
	U.S. TOTAL	$ 82.8
1978	TRANSPORTATION	$ 95.5
	RESIDENTIAL	51.6
	INDUSTRIAL	58.8
	COMMERCIAL	36.7
	U.S. TOTAL	$242.5
1980	TRANSPORTATION	$177.8
	RESIDENTIAL	73.0
	INDUSTRIAL	90.4
	COMMERCIAL	55.5
	U.S. TOTAL	$396.8

PERCENTAGE GROWTH IN INFLATION & ENERGY EXPENDITURES

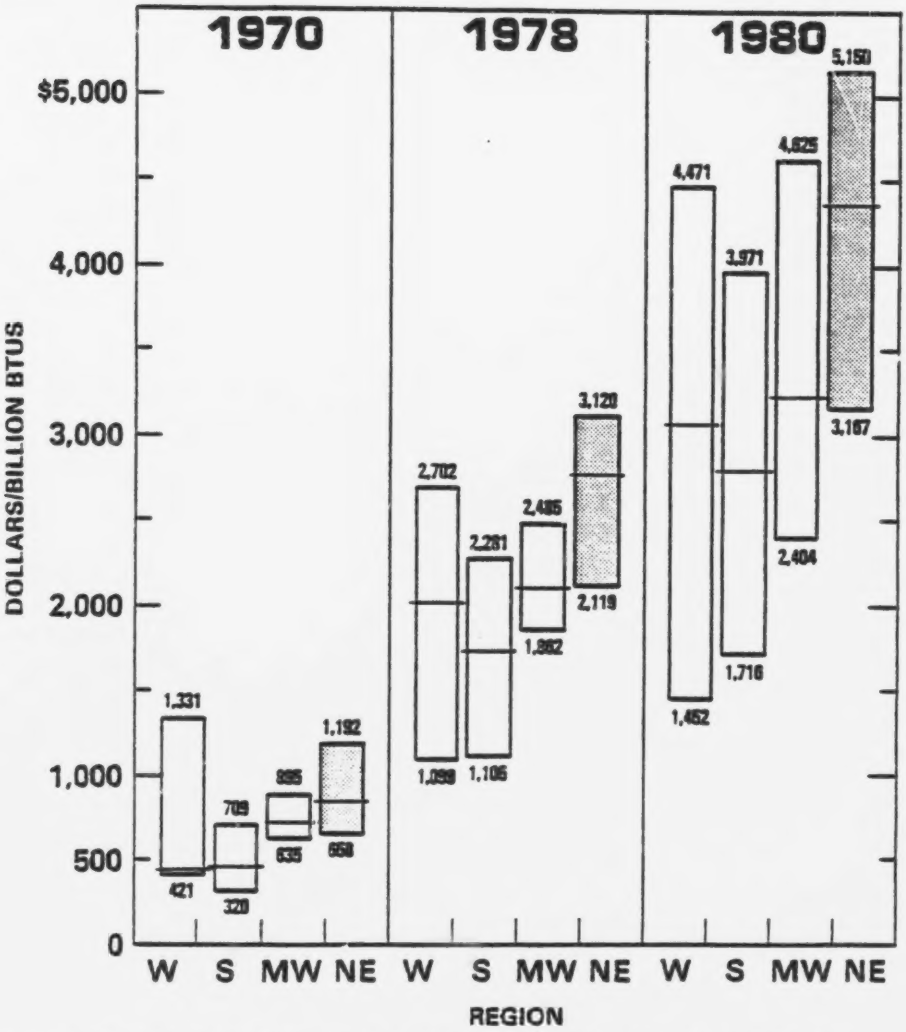


KEY: All calculations made using 1972 dollars.

HOUSEHOLD ENERGY BILLS
1970 and 1980


NEW ENGLAND
~~$386~~
1,325
MID ATLANTIC
~~$333~~
1,100
MIDWEST
~~$367~~
1,150
WEST
~~$263~~
676
SOUTH
~~$288~~
896

REGIONAL INDUSTRIAL PRICES, 1970, 1978 AND 1980



KEY: In reference to each bar, the top number represents the state with the highest expenditure in that specific region; the bottom number represents the state with the lowest expenditure in that specific region; the slash across each bar represents [illegible]

TABLE 1.

AVERAGE REGIONAL ENERGY PRICES BY SECTOR, 1970 - 1980

(S per billion BTUs)

	1970	1978	1980
RESIDENTIAL			
Northeast	$1598	$3870	$5803
Midwest	1430	3048	4388
South	1411	3041	4136
West	1098	2689	3603
U.S. Average	1403	3180	4472
COMMERCIAL			
Northeast	$1249	$3410	$5427
Midwest	1128	2829	4310
South	1076	2729	4120
West	1060	2716	3807
U.S. Average	1135	2921	4420
INDUSTRIAL			
Northeast	$ 847	$2714	$4256
Midwest	723	2110	3130
South	462	1743	2795
West	651	2017	3167
U.S. AVERAGE	628	2036	3166
TRANSPORTATION			
Northeast	$2337	$4690	$8859
Midwest	2488	4956	9336
South	2125	4433	8252
West	2103	4556	9443
U.S. AVERAGE	2235	4614	8622

TABLE 2.
TOTAL REGIONAL ENERGY
EXPENDITURES 1970-80
(millions)

	TRANSPORTATION	RESIDENTIAL	INDUSTRIAL	COMMERCIAL	TOTAL
1970					
Northeast	$ 7,834	$ 5,694	$ 3,849	$ 3,770	$21,147
Midwest	7,926	5,197	4,794	2,779	20,696
South	11,134	5,168	4,790	2,764	23,856
West	9,044	3,736	3,048	2,400	18,228
NE/MW	15,759	10,891	8,642	6,549	41,841
S/W	20,178	8,904	7,838	5,164	42,084
U.S. TOTAL	35,937	19,795	16,480	11,712	83,927
1978					
Northeast	17,903	14,382	11,630	10,865	54,780
Midwest	19,590	13,148	14,829	8,084	55,651
South	32,372	14,897	20,830	9,627	77,726
West	25,647	9,161	10,764	8,113	53,685
NE/MW	37,493	27,530	26,459	18,949	110,431
S/W	58,019	24,058	31,594	17,739	131,410
U.S. TOTAL	95,512	51,588	58,053	36,688	241,841
1980					
Northeast	33,144	21,581	18,238	17,292	90,255
Midwest	36,899	18,930	22,004	12,317	90,150
South	60,265	20,260	33,420	14,529	128,474
West	47,507	12,273	16,906	11,373	88,059
NE/MW	70,044	40,511	40,242	29,609	180,406
S/W	107,772	32,532	50,326	25,902	216,532
U.S. TOTAL	177,816	73,043	90,568	55,511	396,938

TABLE 3.

Regional Percentage of National Energy Use and National Energy Expenditure

	TRANSPORTATION		RESIDENTIAL		INDUSTRIAL		COMMERCIAL		TOTAL	
	BTUS %	COST %	BTUS %	COST %	BTUS %	COST %	BTUS %	COST %	BTUS %	COST %
1970										
Northeast	20.9%	21.8%	25.0%	28.8%	17.3%	23.4%	29.3%	32.2%	21.6%	25.2%
Midwest	19.8	22.1	25.5	26.3%	25.2	29.1%	23.9%	23.7%	23.8	24.7
South	32.6	31.0	25.7	26.1	39.6	29.1	24.9	23.6	32.7	28.4
West	26.7	25.2	23.9	18.9	17.9	18.5	22.0	20.5	21.9	21.7
U.S.	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NE/MW	40.7	43.9	50.5	55.0	42.5	52.4	53.1	55.9	45.4	49.9
S/W	59.3	56.1	49.5	45.0	57.5	47.6	46.9	44.1	54.6	50.1
	TRANSPORTATION		RESIDENTIAL		INDUSTRIAL		COMMERCIAL		TOTAL	
1978	BTUS	COST	BTUS	COST	BTUS	COST	BTUS	COST	BTUS	COST
Northeast	19.4	18.7	22.7	27.9	15.0	20.0	25.4	29.6	19.3	22.7
Midwest	19.8	20.5	26.4	25.5	24.6	25.5	22.8	22.0	23.6	23.0
South	34.8	33.9	30.0	28.9	41.8	35.9	28.1	26.2	35.3	32.1
West	25.9	26.9	20.9	17.8	18.7	18.5	23.8	22.1	21.7	22.2
U.S.	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NE/MW	39.3	39.3	49.2	53.4	39.6	45.6	48.1	51.6	42.9	45.7
S/W	60.7	60.7	50.8	46.6	60.4	54.4	51.9	48.3	57.1	54.3

KEY: If the % of BTUs is higher than the % of cost, the region in which this occurs is at an advantage. If the % of BTUs is lower than the % of cost, the region in which this occurs is at a disadvantage.

STATE RESIDENTIAL ENERGY EXPENDITURES

	Dollars per Billion BTUs	Price Index	Billion BTUs per Household	Total Expenditure Per Household	Household Cost Index	Total State Expenditures in Millions
NATIONAL TOTAL						
1970	$1,403	100	.22	$315	100	$19,795
1974	2,106	100	.22	458	100	31,881
1978	3,180	100	.21	679	100	51,588
1980*	4,472	100		963	100	73,043
NORTHEAST						
Connecticut						
1970	1,628	116	.24	384	122	358
1974	2,962	141	.23	665	145	672
1978	3,984	125	.22	857	126	926
1980*	6,346	142		1,366	142	1,475
Maine						
1970	1,624	116	.24	382	121	115
1974	2,679	127	.23	607	133	204
1978	3,666	115	.24	867	128	322
1980*	6,126	137		1,449	151	538
Massachusetts						
1970	1,745	124	.22	385	122	677
1974	2,920	139	.21	627	137	1,195
1978	4,107	129	.20	819	121	1,654
1980*	6,389	143		1,274	132	2,574
New Hampshire						
1970	1,673	119	.25	412	131	93
1974	2,740	130	.24	658	144	171
1978	4,039	127	.23	946	139	282
1980*	6,193	138		1,450	151	432
Rhode Island						
1970	1,684	120	.21	358	114	105
1974	2,939	140	.20	594	130	183
1978	4,169	131	.20	822	121	268
1980*	6,328	142		1,248	130	407
Vermont						
1970	1,558	111	.28	430	137	56
1974	2,595	123	.25	658	144	99
1978	3,755	118	.24	891	131	146
1980*	5,669	127		1,346	140	221

STATE RESIDENTIAL ENERGY EXPENDITURES (continued)

	Dollars per Billion BTUs	Price Index	Billion BTUs per Household	Total Expenditure Per Household	Household Cost Index	Total State Expenditures in Millions
Delaware						
1970	$1,614	115	.23	$365	116	$60
1974	2,867	136	.20	586	128	107
1978	4,116	129	.20	835	123	166
1980*	5,644	126		1,149	119	225
Maryland						
1970	1,550	110	.19	298	95	347
1974	2,630	125	.18	470	103	612
1978	3,764	118	.17	657	97	930
1980*	5,100	114		891	93	1,261
New Jersey						
1970	1,746	124	.21	368	117	811
1974	2,880	137	.20	567	124	1,351
1978	4,191	132	.19	793	117	1,998
1980*	6,207	139		1,176	122	2,962
New York						
1970	1,634	116	.20	324	103	1,903
1974	2,901	138	.19	529	118	3,342
1978	4,087	129	.17	708	104	4,540
1980*	6,236	139		1,086	113	6,923
Pennsylvania						
1970	1,507	107	.22	336	107	1,179
1974	2,406	114	.21	504	110	1,917
1978	3,488	110	.23	793	117	3,150
1980*	4,817	108		1,138	118	4,523
Northeast Total						
1970	1,598	114	.21	338		5,694
1978	3,870	122	.20	758		14,382
1980*	5,808	130	.20	1,138		21,581
MIDWEST						
Illinois						
1970	1,415	101	.26	363	115	1,242
1974	1,380	94	.26	517	113	1,895
1978	3,399	97	.27	835	123	3,253
1980*	4,402	98		1,195	124	4,659

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE RESIDENTIAL ENERGY EXPENDITURES (continued)

	Dollars per Billion BTUs	Price Index	Billion BTUs per Household	Total Expenditure Per Household	Household Cost Index	Total State Expenditures in Millions
Indiana						
1970	$1,346	96	.29	$386	123	$612
1974	1,881	89	.29	537	117	928
1978	2,949	93	.29	841	124	1,551
1980*	4,355	97		1,246	129	2,298
Iowa						
1970	1,374	98	.29	400	127	357
1974	1,937	92	.28	539	118	519
1978	3,046	96	.26	798	118	813
1980*	4,307	96		1,137	118	1,159
Michigan						
1970	1,315	94	.27	349	111	916
1974	1,924	91	.26	499	109	1,437
1978	3,073	97	.24	736	108	2,275
1980*	4,364	98		1,050	109	3,244
Minnesota						
1970	1,428	102	.29	415	132	471
1974	2,001	95	.28	560	122	709
1978	3,052	96	.25	762	112	1,049
1980*	4,426	99		1,112	116	1,531
Ohio						
1970	1,254	89	.26	332	105	1,070
1974	1,826	87	.26	471	103	1,630
1978	3,084	97	.25	786	116	2,871
1980*	4,267	95		1,104	115	4,032
Wisconsin						
1970	1,430	102	.29	411	130	529
1974	2,087	99	.27	563	123	818
1978	3,166	100	.27	841	124	1,336
1980*	4,729	106		1,264	131	2,007
Midwest Total						
1970	1,430	102	.25	367	117	5,197
1978	3,048	96	.26	799	118	13,148
1980*	4,388	98	.26	1,150	119	18,930

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE RESIDENTIAL ENERGY EXPENDITURES (continued)

	Dollars per Billion BTUs	Price Index	Billion BTUs per Household	Total Expenditure Per Household	Household Cost Index	Total State Expenditures in Millions
SOUTH						
Alabama						
1970	$1,195	85	.23	$273	87	$283
1974	1,807	86	.24	433	95	492
1978	2,938	92	.23	668	98	832
1980*	3,697	83		952	99	1,185
Arkansas						
1970	1,195	85	.27	323	103	199
1974	1,917	91	.25	471	103	328
1978	3,045	96	.25	769	113	589
1980*	3,753	84		948	98	725
Washington, D.C.						
1970	1,625	116	.17	271	86	71
1974	2,653	126	.15	404	88	111
1978	3,778	119	.16	594	87	163
1980*	5,016	112		789	82	217
Florida						
1970	1,617	115	.17	274	87	625
1974	2,467	117	.17	418	91	1,213
1978	3,457	109	.18	620	91	2,031
1980*	4,577	102		821	85	2,689
Georgia						
1970	1,264	90	.20	256	81	348
1974	1,905	90	.19	364	79	560
1978	2,983	94	.21	638	94	1,083
1980*	3,942	88		843	88	1,431
Kentucky						
1970	1,193	85	.23	269	85	259
1974	1,680	80	.21	345	75	367
1978	2,580	81	.20	526	77	508
1980	3,576	80		729	76	360
Louisiana						
1970	1,320	94	.21	280	89	294
1974	1,759	83	.23	398	87	462
1978	2,619	82	.22	581	86	749
1980*	3,482	78		773	80	995

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE RESIDENTIAL ENERGY EXPENDITURES (continued)

	Dollars per Billion BTUs	Price Index	Billion BTUs per Household	Total Expenditure Per Household	Expenditure Index	Total State Expenditures in Millions
Mississippi						
1970	$1,176	84	.25	$296	94	$232
1974	1,947	92	.26	506	110	418
1978	3,036	97	.22	669	100	511
1980*	4,189	94		922	96	706
North Carolina						
1970	1,394	99	.23	315	100	470
1974	2,272	108	.20	458	100	770
1978	3,304	104	.21	684	101	1,277
1980*	4,502	101		938	97	1,750
Oklahoma						
1970	1,362	97	.25	342	109	291
1974	1,732	82	.25	440	96	419
1978	2,776	87	.25	693	102	729
1980*	3,612	81		902	94	94
South Carolina						
1970	1,430	102	.21	307	97	222
1974	2,289	109	.20	460	100	383
1978	3,161	99	.21	679	100	636
1980*	4,383	98		950	99	889
Tennessee						
1970	958	68	.25	239	76	285
1974	1,430	68	.24	338	74	453
1978	2,419	76	.26	634	93	942
1980*	3,579	80		942	98	1,401
Texas						
1970	1,361	97	.22	303	96	1,040
1974	1,848	88	.22	413	90	1,618
1978	3,126	98	.23	708	104	3,139
1980*	4,233	95		959	100	4,250
Virginia						
1970	1,504	107	.20	305	97	418
1974	2,364	112	.19	455	99	694
1978	3,541	111	.20	693	102	1,205
1980*	4,933	110		972	101	1,690

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE RESIDENTIAL ENERGY EXPENDITURES (continued)

	Dollars per Billion BTUs	Price Index	Billion BTUs per Household	Total Expenditure Per Household	Expenditure Index	Total State Expenditures in Millions
West Virginia						
1970	$1,232	88	.20	$243	77	$131
1974	1,758	83	.21	363	79	208
1978	2,921	92	.22	638	94	403
1980*	3,729	83		829	86	524
South Total						
1970	1,411	101	.21	288	91	5,168
1978	3,041	96	.22	659	97	14,397
1980*	4,136	92	.22	896	93	20,250
WEST						
Alaska						
1970	$1,893	135	.21	$389	123	$30
1974	2,359	112	.19	456	100	42
1978	2,815	89	.27	758	112	90
1980*	4,295	96		1,027	107	122
Arizona						
1970	1,682	120	.16	267	85	144
1974	2,192	104	.18	392	86	275
1978	3,791	119	.17	638	94	519
1980*	4,966	111		836	87	660
California						
1970	1,325	94	.16	209	66	1,373
1974	1,947	92	.15	299	65	2,221
1978	2,813	88	.14	393	58	3,300
1980*	3,604	81		503	52	4,229
Colorado						
1970	1,235	88	.23	285	90	194
1974	1,657	79	.22	368	80	307
1978	2,564	81	.21	527	78	498
1980*	3,594	80		736	78	705
Hawaii						
1970	2,067	147	.10	204	65	41
1974	2,334	136	.10	289	63	59
1978	4,656	146	.10	446	66	121
1980*	5,344	133		569	59	155

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE RESIDENTIAL ENERGY EXPENDITURES (continued)

	Dollars per Billion BTUs	Price Index	Billion BTUs per Household	Total Expenditure Per Household	Expenditure Index	Total State Expenditures in Millions
Idaho						
1970	$1,373	98	.25	$343	109	$73
1974	1,714	81	.27	462	101	116
1978	2,314	73	.29	679	100	194
1980*	5,944	133		1,012	105	290
Kansas						
1970	1,168	83	.28	326	103	237
1974	1,560	74	.27	426	93	334
1978	2,607	82	.26	669	99	570
1980*	3,369	75		898	93	764
Missouri						
1970	1,379	98	.24	334	106	507
1974	1,896	90	.24	459	100	749
1978	2,987	94	.25	755	111	1,313
1980*	4,121	92		1,046	109	1,821
Montana						
1970	1,302	93	.25	329	104	71
1974	1,720	82	.24	406	89	100
1978	2,375	75	.27	632	93	175
1980*	3,349	75		892	93	247
Nebraska						
1970	1,215	87	.31	379	120	179
1974	1,689	80	.27	448	98	234
1978	2,675	84	.26	703	104	390
1980*	3,738	84		983	102	546
Nevada						
1970	1,321	94	.25	328	104	52
1974	1,715	81	.24	418	91	83
1978	2,915	92	.22	640	94	155
1980*	3,740	84		822	85	200
New Mexico						
1970	1,334	95	.23	322	98	89
1974	1,911	91	.19	365	79	125
1978	3,276	103	.16	538	79	214
1980*	4,533	101		744	77	296

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE RESIDENTIAL ENERGY EXPENDITURES (continued)

	Dollars per Billion BTUs	Price Index	Billion BTUs per Household	Total Expenditure Per Household	Household Cost Index	Total State Expenditures in Millions
North Dakota						
1970	$1,536	109	.28	$429	136	$76
1974	2,117	101	.26	544	119	106
1978	2,915	92	.27	798	118	166
1980*	3,939	88		1,126	117	234
Oregon						
1970	1,145	82	.24	272	86	188
1974	1,465	70	.23	332	72	266
1978	2,343	74	.20	480	71	435
1980*	3,024	68		620	64	562
South Dakota						
1970	1,439	103	.31	441	140	88
1974	2,065	98	.27	563	123	123
1978	2,872	90	.28	814	120	191
1980*	4,104	92		1,164	121	273
Utah						
1970	1,165	83	.25	292	93	86
1974	1,488	71	.27	399	87	134
1978	2,617	82	.23	608	90	234
1980*	3,462	77		828	86	319
Washington						
1970	1,033	74	.23	242	77	268
1974	1,215	58	.24	296	65	359
1978	1,617	51	.23	365	54	506
1980*	2,218	50		501	52	697
Wyoming						
1970	1,152	82	.33	386	123	40
1974	1,658	79	.26	429	94	51
1978	2,442	77	.26	647	95	90
1980*	3,444	77		964	100	134
West Total						
1970	1,098	78	.24	263	84	3,736
1978	2,689	85	.19	505	74	9,161
1980*	3,603	81	.19	676	70	12,273

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE COMMERCIAL ENERGY EXPENDITURES 1970-1980

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in wages	Energy Expenditures Total (millions)	Total State Energy Expenditures as % of National Total	Total State Wages as a % of National Total
NATIONAL TOTAL						
1970	$1,135	100	3.9¢	$11,712.2	100%	100%
1974	1,952	100	5.1	22,353.9	100%	100%
1978	2,921	100	5.7	36,688.2	100%	100%
1980*	4,420	100	7.1	55,511.0	100%	100%
NORTHEAST						
Connecticut						
1970	1,375	121	3.6	163.9	1.40%	1.50%
1974	2,771	143	5.8	376.9	1.69	1.48
1978	3,383	118	5.5	511.3	1.39	1.43
1980*	5,334	119	7.2	806.1	1.45	1.43
Maine						
1970	1,111	98	5.1	59.8	.51	.38
1974	2,308	119	7.8	130.7	.58	.38
1978	3,012	105	8.1	199.8	.54	.39
1980*	5,468	122	12.0	362.8	.65	.38
Massachusetts						
1970	1,073	95	5.4	510.5	4.36	3.14
1974	2,540	131	9.0	1,169.4	5.23	2.99
1978	3,443	120	8.6	1,544.7	4.21	2.79
1980*	6,015	135	12.3	2,698.3	4.86	2.79
New Hampshire						
1970	1,278	113	5.3	45.8	.39	.28
1974	2,417	125	7.2	96.5	.43	.31
1978	3,565	124	7.0	146.7	.40	.33
1980*	6,127	137	9.9	252.2	.45	.33
Rhode Island						
1970	1,155	102	7.7	63.2	.54	.47
1974	2,519	130	8.1	143.2	.64	.41
1978	3,219	112	7.5	189.0	.52	.39
1980*	5,540	124	10.7	325.3	.59	.39
Vermont						
1970	1,250	110	5.7	31.9	.27	.18
1974	2,490	129	7.6	58.5	.26	.18
1978	3,285	114	8.0	87.6	.24	.17
1980*	5,706	128	11.4	152.1	.27	.17

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE COMMERCIAL ENERGY EXPENDITURES 1970-1980 (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in wages	Energy Expenditures Total (millions)	Total State Energy Expenditures as % of National Total	Total State Wages as a % of National Total
Delaware						
1970	$1,242	110	4.6¢	$37.2	.32%	.27%
1974	2,433	126	6.6	79.8	.36	.28
1978	3,688	128	7.7	129.0	.35	.26
1980*	5,544	124	9.5	193.9	.35	.26
Maryland						
1970	1,305	115	3.5	243.3	2.08	2.30
1974	2,454	127	4.8	508.0	2.27	2.40
1978	3,539	123	5.1	752.2	2.05	2.30
1980*	5,138	115	6.0	1,092.0	1.97	2.30
New Jersey						
1970	1,305	115	5.5	583.9	4.99	2.30
1974	2,641	137	7.7	1,198.7	5.36	3.56
1978	3,625	126	7.6	1,675.0	4.57	3.40
1980*	5,874	132	10.2	2,714.1	4.89	3.39
New York						
1970	1,339	118	3.9	1,434.4	12.25	11.98
1974	2,885	149	6.3	3,058.9	13.58	11.20
1978	3,464	120	5.7	3,564.7	9.72	9.55
1980*	5,423	121	7.4	5,580.5	10.05	9.61
Pennsylvania						
1970	1,150	102	3.9	595.9	5.09	5.02
1974	2,144	111	5.4	1,137.1	5.09	4.86
1978	3,153	110	6.8	2,064.8	5.63	4.69
1980*	4,756	107	8.5	3,115.1	5.61	4.67
Northeast Total						
1970	1,249	110	4.3	3,769.8	32.19	29.03
1974	2,503	133	6.5	7,957.7	35.60	27.30
1978	3,410	117	6.5	10,864.8	29.60	25.30
1980*	5,427	123	8.6	17,292.4	31.15	25.30
MIDWEST						
Illinois						
1970	$1,111	98	4.6¢	813.8	6.39%	5.38%
1974	1,861	96	5.6	1,397.5	6.25	5.69
1978	2,384	100	6.7	2,407.3	6.56	5.56
1980*	4,323	97	8.3	3,608.9	6.50	5.54

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE COMMERCIAL ENERGY EXPENDITURES 1970-1980 (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in wages	Energy Expenditures Total (millions)	Total State Energy Expenditures as % of National Total	Total State Wages as a % of National Total
Indiana						
1970	$1,080	95	4.7¢	$275.7	2.35%	1.92%
1974	1,718	89	6.3	517.3	2.31	1.88
1978	2,606	91	6.8	836.5	2.28	1.90
1980*	4,167	93	9.0	1,337.7	2.41	1.89
Iowa						
1970	1,151	102	5.3	164.3	1.40	1.03
1974	1,666	86	5.9	260.7	1.17	1.01
1978	2,777	97	6.6	458.8	1.25	1.07
1980*	4,495	101	8.8	742.8	1.34	1.07
Michigan						
1970	1,267	112	4.3	506.4	4.32	3.84
1974	1,859	96	5.4	910.5	4.07	3.87
1978	3,092	108	5.8	1,416.5	3.86	3.81
1980*	4,625	104	7.1	2,119.1	3.82	3.80
Minnesota						
1970	989	87	3.6	191.1	1.63	1.76
1974	1,586	82	4.5	345.8	1.55	1.75
1978	2,512	87	5.0	578.8	1.58	1.80
1980*	4,162	93	6.8	958.9	1.73	1.80
Ohio						
1970	1,107	98	4.3	571.3	4.88	4.43
1974	1,758	91	5.4	1,014.6	4.54	4.33
1978	2,807	98	6.0	1,637.8	4.46	4.20
1980*	4,178	94	7.4	2,437.4	4.39	4.19
Wisconsin						
1970	1,140	101	4.8	251.2	2.14	1.72
1974	1,863	96	5.7	432.5	1.93	1.72
1978	2,824	98	6.7	748.0	2.04	1.75
1980*	4,198	94	8.1	1,111.8	2.00	1.74
Midwest Total						
1970	1,128	99	4.5	2,778.8	23.72	20.57
1974	1,790	92	5.5	4,878.9	21.82	20.16
1978	2,829	97	6.2	8,083.7	22.00	20.09
1980*	4,310	98	7.8	12,316.6	22.19	20.09

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE COMMERCIAL ENERGY EXPENDITURES 1970-1980 (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in wages	Energy Expenditures Total (millions)	Total State Energy Expenditures as % of National Total	Total State Wages as a % of National Total
SOUTH						
Alabama						
1970	$1,052	93	3.6¢	$136.6	1.17%	1.25%
1974	1,709	88	5.0	281.3	1.26	1.29
1978	2,740	95	5.4	462.9	1.26	1.32
1980*	4,441	99	7.2	750.1	1.35	1.32
Arkansas						
1970	986	87	5.6	94.6	.81	.56
1974	1,613	83	6.8	177.2	.79	.59
1978	2,654	92	10.4	423.9	1.16	.63
1980*	3,635	81	11.7	580.5	1.05	.63
Washington, D.C.						
1970	882	78	1.7	80.7	.69	1.60
1974	2,208	114	2.0	131.2	.59	1.51
1978	3,517	122	1.7	164.5	.45	1.47
1980*	4,978	111	2.0	232.8	.42	1.46
Florida						
1970	1,493	132	3.7	396.7	3.39	3.49
1974	2,383	123	5.0	877.5	3.93	4.32
1978	3,282	114	5.2	1,323.2	3.61	3.95
1980*	4,615	103	6.0	1,860.4	3.35	3.93
Georgia						
1970	1,178	104	3.5	220.5	1.88	2.09
1974	1,902	98	4.5	438.2	1.96	2.22
1978	2,817	98	5.1	736.8	2.01	2.23
1980*	4,156	93	6.2	1,087.2	1.96	2.22
Kentucky						
1970	932	82	3.5	117.4	1.00	[illegible]
1974	1,260	65	3.7	178.0	.80	1.10
1978	2,068	72	4.9	364.3	.99	1.18
1980*	3,331	75	6.5	586.8	1.06	1.14
Louisiana						
1970	954	84	4.4	183.8	1.37	1.39
1974	1,463	76	5.3	326.3	1.46	1.40
1978	2,191	76	5.5	554.6	1.51	1.55
1980*	3,539	79	7.3	895.9	1.61	1.56

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

BEST DOCUMENT AVAILABLE

STATE COMMERCIAL ENERGY EXPENDITURES 1970-1980 (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in wages	Energy Expenditures Total (millions)	Total State Energy Expenditures as % of National Total	Total State Wages as a % of National Total
Mississippi						
1970	$1,054	93	4.2¢	$84.7	.72%	.66%
1974	1,694	88	6.1	188.1	.84	.70
1978	2,770	96	7.0	325.0	.89	.72
1980*	4,619	103	9.6	541.9	.98	.72
North Carolina						
1970	1,073	95	3.7	216.6	1.85	1.94
1974	1,843	95	4.8	427.4	1.91	2.05
1978	2,755	96	5.1	660.4	1.80	2.03
1980*	3,929	88	5.9	941.8	1.70	2.02
Oklahoma						
1970	958	85	4.0	131.1	1.12	1.07
1974	1,422	74	5.0	230.8	1.03	1.05
1978	2,399	83	6.5	469.3	1.28	1.12
1980*	4,128	92	9.2	807.4	1.45	1.12
South Carolina						
1970	1,069	94	3.3	95.1	.81	.95
1974	1,771	92	4.4	196.0	.88	1.01
1978	2,642	92	6.0	387.5	1.06	1.00
1980*	3,716	83	6.9	545.2	.98	1.00
Tennessee						
1970	998	88	3.7	163.0	1.39	1.46
1974	1,551	80	4.2	285.2	1.28	1.57
1978	2,632	92	5.6	593.6	1.62	1.65
1980*	4,059	91	7.1	915.5	1.65	1.65
Texas						
1970	1,012	89	3.4	538.2	4.60	5.18
1974	1,517	78	4.1	977.4	4.37	5.43
1978	2,750	96	5.3	2,103.3	5.73	6.16
1980*	4,243	95	6.7	3,245.2	5.85	6.13
Virginia						
1970	1,126	99	3.2	241.3	2.06	2.50
1974	1,852	96	4.3	482.3	2.16	2.59
1978	2,971	103	5.1	851.7	2.32	2.58
1980*	4,360	98	6.2	1,250.0	2.25	2.57

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE COMMERCIAL ENERGY EXPENDITURES 1970-1980 (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in wages	Energy Expenditures Total (millions)	Total State Energy Expenditures as % of National Total	Total State Wages as a % of National Total
West Virginia						
1970	$1,032	91	3.9¢	$63.6	.54%	.53%
1974	1,606	83	5.1	118.0	.53	.53
1978	2,524	88	5.6	205.6	.56	.57
1980*	3,539	79	6.5	288.2	.52	.56
outh Total						
1970	1,076	95	3.5	2,763.9	23.60	25.77
1974	1,729	89	4.5	5,314.9	23.73	25.93
1978	2,729	93	5.3	9,626.6	26.20	28.14
1980*	4,120	93	6.6	14,528.9	26.17	28.14
EST						
Alaska						
1970	1,249	110	4.5	40.8	.35	.30
1974	2,003	104	5.1	80.2	.36	.36
1978	2,631	92	5.3	131.7	.36	.38
1980*	4,521	101	7.5	226.4	.41	.38
Arizona						
1970	1,127	99	4.3	117.9	1.01	.90
1974	1,697	88	5.3	245.5	1.10	1.05
1978	3,135	109	6.5	473.7	1.29	1.13
1980*	4,578	102	7.3	690.6	1.24	2.93
California						
1970	1.128	100	2.4	912.1	7.79	12.33
1974	1,809	94	3.1	1,649.8	7.38	12.46
1978	3,374	117	4.6	3,711.4	10.12	12.58
1980*	4,100	92	4.6	4,509.6	8.12	12.53
Colorado						
1970	990	87	4.1	150.1	1.28	1.21
1974	1,453	75	4.4	264.5	1.18	1.37
1978	2.215	77	4.6	423.5	1.15	1.43
1980*	3,543	79	6.0	677.4	1.22	1.42
Hawaii						
1970	2.110	186	1.6	29.9	.25	.62
1974	3,117	161	1.3	50.1	.22	.63
1978	5,027	175	2.4	95.2	.25	.61
1980*	6,678	150	2.6	126.5	.23	.61

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE COMMERCIAL ENERGY EXPENDITURES 1970-1980 (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in wages	Energy Expenditures Total (millions)	Total State Energy Expenditures as % of National Total	Total State Wages as a % of National Total
Idaho						
1970	$984	87	5.7¢	$48.2	.41%	.28%
1974	1,381	71	6.3	86.1	.39	.31
1978	1,955	68	6.5	147.3	.40	.35
1980*	3,014	68	8.2	227.1	.41	.35
Kansas						
1970	975	86	4.3	121.3	1.04	.92
1974	1,352	70	4.7	187.8	.84	.91
1978	2,272	79	6.7	409.4	1.12	.95
1980*	3,529	79	8.5	636.0	1.15	.95
Missouri						
1970	1,066	94	3.7	250.9	2.14	2.21
1974	1,598	83	4.4	407.2	1.82	2.10
1978	2,605	91	6.3	834.8	2.28	2.05
1980*	3,964	89	7.9	1,270.2	2.29	2.05
Montana						
1970	990	87	5.4	46.8	.40	.29
1974	1,467	76	5.4	70.8	.32	.30
1978	2,055	71	5.8	121.2	.33	.32
1980*	3,265	73	7.6	192.6	.35	.32
Nebraska						
1970	897	79	4.8	97.2	.83	.67
1974	1,333	69	4.9	141.2	.63	.66
1978	2,200	77	5.8	251.9	.69	.67
1980*	3,486	78	7.6	399.2	.72	.67
Nevada						
1970	1,079	95	3.2	44.8	.38	.45
1974	1,540	80	4.2	85.4	.38	.46
1978	2,706	94	4.6	158.5	.43	.52
1980*	3,730	84	5.2	218.4	.39	.53
New Mexico						
1970	938	83	4.4	67.1	.57	.50
1974	1,467	76	4.9	110.9	.50	.51
1978	2,596	90	5.8	206.1	.56	.55
1980*	4,014	90	7.4	318.7	.57	.55

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

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STATE COMMERCIAL ENERGY EXPENDITURES 1970-1980 (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in wages	Energy Expenditures Total (millions)	Total State Energy Expenditures as % of National Total	Total State Wages as a % of National Total
North Dakota						
1970	$988	87	4.1¢	$33.3	.25%	.27%
1974	1,530	79	5.4	63.9	.29	.27
1978	2,200	77	5.1	91.5	.25	.28
1980*	3,455	77	6.6	143.7	.25	.28
Oregon						
1970	1,032	91	5.1	147.7	1.26	.96
1974	1,529	79	5.6	248.0	1.11	1.02
1978	1,979	69	4.5	326.0	.89	1.12
1980*	3,036	68	5.7	500.2	.90	1.12
South Dakota						
1970	1,160	102	5.2	39.7	.34	.25
1974	1,707	88	5.7	61.9	.28	.25
1978	2,268	79	4.7	77.0	.21	.25
1980*	3,625	81	6.2	123.1	.22	.25
Utah						
1970	1,040	92	3.8	58.1	.50	.51
1974	1,600	83	4.7	107.8	.48	.52
1978	2,346	82	4.8	177.1	.48	.57
1980*	3,398	90	6.7	301.7	.54	.57
Washington						
1970	951	84	3.0	163.8	1.40	1.82
1974	1,361	70	3.7	288.0	1.29	1.77
1978	1,701	59	3.0	376.2	1.03	1.97
1980*	2,786	62	4.0	616.4	1.11	1.96
Wyoming						
1970	821	72	6.7	30.0	.26	.15
1974	1,356	70	7.6	53.3	.24	.16
1978	1,949	68	8.1	100.6	.27	.19
1980*	3,781	85	12.9	195.3	.35	.19
West Total						
1970	1,060	93	3.2	2,399.7	20.49	24.63
1974	1,620	83	3.8	4,202.4	18.30	25.01
1978	2,716	93	4.8	8,113.1	22.10	25.97
1980*	3,307	86	5.6	11,373.1	20.49	25.97

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE INDUSTRIAL ENERGY EXPENDITURES

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in Wages	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures	% of Wages Salar
NATIONAL TOTAL						
1970	628	100	9.4	16,479.9	100	10
1974	1228	100	15.5	34,085.8	100	10
1978	2036	100	18.4	58,052.8	100	10
1980*	3166	100	23.6	90,568.6	100	10
NORTHEAST						
Connecticut						
1970	705	112	3.8	148.6	.90	2.3
1974	1,946	158	7.6	372.3	1.09	2.2
1978	2,612	128	8.8	573.0	.99	2.0
1980*	3,959	125	12.9	1,012.2	1.12	2.0
Maine						
1970	1,192	190	4.5	83.1	.50	.4
1974	2,254	184	9.0	233.9	.69	.3
1978	2,555	125	6.4	284.7	.49	.3
1980*	4,564	144	9.4	508.6	.56	.3
Massachusetts						
1970	997	159	4.1	212.0	1.29	3.1
1974	2,402	196	8.2	519.7	1.52	2.9
1978	3,058	150	8.2	726.4	1.25	2.8
1980*	5,150	163	11.3	1,223.5	1.35	2.8
New Hampshire						
1970	911	145	6.9	42.3	.26	.3
1974	2,212	180	13.6	111.8	.33	.3
1978	3,120	149	14.7	189.4	.33	.4
1980*	4,937	156	19.8	310.0	.34	.4
Rhode Island						
1970	938	149	4.7	38.6	.23	.5
1974	2,454	200	9.0	97.0	.28	.4
1978	3,040	149	8.3	123.6	.21	.4
1980*	4,985	157	11.2	202.8	.22	.4
Vermont						
1970	1,030	164	7.4	23.3	.14	.1
1974	2,135	174	13.5	55.6	.16	.1
1978	2,707	133	15.2	93.6	.16	.2
1980*	4,518	143	20.8	156.2	.17	.2

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE INDUSTRIAL ENERGY EXPENDITURES (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in Wages	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures	% of Wages Salar
Delaware						
1970	705	112	7.6	53.8	.33	.43
1974	1,946	158	14.6	143.9	.42	.45
1978	2,612	128	13.8	182.9	.32	.42
1980*	3,959	125	17.2	277.3	.31	.42
Maryland						
1970	684	109	12.0	262.0	1.59	1.34
1974	1,508	123	20.8	574.2	1.68	1.25
1978	2,292	113	23.2	842.4	1.45	1.15
1980*	3,293	104	27.4	1,210.6	1.33	1.15
New Jersey						
1970	910	145	5.9	440.6	2.67	4.57
1974	2,212	180	10.5	982.8	2.88	4.23
1978	3,120	153	11.8	1,408.4	2.43	3.79
1980*	4,937	156	15.3	2,228.6	2.46	3.79
New York						
1970	805	128	5.1	807.1	4.90	9.65
1974	1,648	134	7.9	1,443.0	4.23	8.28
1978	2,412	118	8.8	2,026.2	3.49	7.32
1980*	3,830	121	11.7	3,271.4	3.61	7.32
Pennsylvania						
1970	658	105	4.8	1,338.8	8.12	7.58
1974	1,300	106	15.8	2,547.6	7.47	7.33
1978	2,119	104	18.9	3,960.3	6.82	6.66
1980*	3,167	100	23.2	5,918.0	6.53	6.66
Northeast Total						
1970	847	135	7.7	3,848.5	23.35	30.55
1974	1836	155	12.8	7952.8	23.33	28.14
1978	2714	136	14.4	11,629.9	20.03	25.67
1980*	4256	134	18.5	18,238.4	20.14	25.67
MIDWEST						
Illinois						
1970	759	121	8.0	955.7	5.30	7.30
1974	1,423	116	12.0	1,918.7	5.63	7.24
1978	2,330	114	15.0	3,168.1	5.46	6.71
1980*	3,607	114	19.1	4,905.0	5.42	6.71

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE INDUSTRIAL ENERGY EXPENDITURES (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in Wages	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures	% of Wages Salar
Indiana						
1970	635	101	12.3	745.7	4.52	3.69
1974	1,098	89	16.3	1,374.5	4.03	3.82
1978	1,862	91	19.8	2,369.8	4.08	3.80
1980*	2,754	87	24.1	3,503.8	3.87	3.80
Iowa						
1970	848	135	15.1	273.4	1.66	1.10
1974	1,411	115	20.0	547.3	1.61	1.25
1978	2,245	110	23.0	888.9	1.53	1.22
1980*	3,526	112	29.8	1,395.7	1.54	1.22
Michigan						
1970	773	123	7.7	838.2	5.09	6.60
1974	1,406	115	10.2	1,536.8	4.51	6.81
1978	2,485	122	11.8	2,561.1	4.41	7.32
1980*	3,379	107	13.1	3,694.3	4.08	7.32
Minnesota						
1970	895	142	12.0	339.8	2.06	1.72
1974	1,548	126	17.1	652.3	1.91	1.73
1978	2,173	107	18.6	1,050.0	1.81	1.79
1980*	3,190	101	22.5	1,541.4	1.70	1.79
Ohio						
1970	645	103	9.7	1,242.1	7.54	7.77
1974	1,118	91	13.2	2,234.1	6.55	7.68
1978	1,902	93	11.6	3,648.3	6.28	7.41
1980*	2,742	87	18.5	5,259.3	5.81	7.41
Wisconsin						
1970	827	132	9.4	398.6	2.42	2.59
1974	1,411	115	11.0	662.2	1.94	2.72
1978	2,247	110	13.3	1,142.8	1.97	2.72
1980*	3,352	106	16.3	1,704.8	1.88	2.72
Midwest Total						
1970	723	115	9.5	4,793.5	29.09	30.78
1974	1,281	104	13.0	8,925.9	26.19	31.25
1978	2,110	104	15.2	14,829.0	25.54	30.37
1980*	3,130	99	18.5	22,004.2	24.30	30.37

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE INDUSTRIAL ENERGY EXPENDITURES (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures $/$1 in Wages	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures	% of Wages Salar
SOUTH						
Alabama						
1970	495	79	17.6	381.4	2.31	1.32
1974	910	74	27.4	690.7	2.03	1.40
1978	1,893	93	32.4	1,521.7	2.62	1.49
1980*	2,920	92	41.1	2,347.4	2.59	1.49
Arkansas						
1970	518	82	17.1	168.1	1.02	.60
1974	1,073	87	25.1	287.4	1.14	.70
1978	1,873	92	28.1	668.1	1.15	.75
1980*	2,970	94	36.7	1,059.6	1.17	.75
Washington, D.C.						
1970	705	112	21.5	39.8	.24	.11
1974	1,946	159	30.2	69.8	.20	.10
1978	2,612	128	35.9	101.0	.17	.09
1980*	3,959	125	40.1	136.6	.15	.09
Florida						
1970	709	113	10.6	256.4	1.56	1.48
1974	1,575	128	17.5	620.6	1.82	1.61
1978	2,271	112	23.5	1,237.1	2.13	1.67
1980*	3,861	122	32.9	2,102.9	2.32	1.67
Georgia						
1970	631	100	8.8	261.8	1.59	1.82
1974	1,336	109	13.4	652.6	1.91	1.81
1978	2,281	112	19.8	1,167.8	2.01	1.87
1980*	3,565	113	25.5	1,825.0	2.01	1.87
Kentucky						
1970	564	90	13.3	274.8	1.67	1.26
1974	973	79	16.8	551.8	1.62	1.49
1978	1,903	93	17.9	882.3	1.52	1.56
1980*	3,013	95	23.3	1,396.6	1.54	1.56
Louisiana						
1970	320	51	27.4	503.7	3.06	1.12
1974	758	62	53.9	1,399.3	4.11	1.18
1978	1,105	54	53.6	2,385.5	4.11	1.41
1980*	1,716	54	68.5	3,703.9	4.09	1.41

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE INDUSTRIAL ENERGY EXPENDITURES (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in Wages	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures	% of U Wages Salari
Mississippi						
1970	578	92	15.9	172.0	1.04	.66
1974	1,201	98	9.5	360.4	1.06	.75
1978	2,268	111	11.6	652.2	1.12	.81
1980*	3,971	125	36.8	1,141.7	1.26	.81
North Carolina						
1970	709	113	7.5	316.2	1.92	2.57
1974	1,443	118	12.3	751.3	2.20	2.76
1978	2,247	110	15.6	1,284.1	2.21	2.71
1980*	3,536	112	19.4	2,021.3	2.23	2.71
Oklahoma						
1970	454	72	12.8	169.0	1.03	.81
1974	893	73	19.5	377.3	1.11	.88
1978	1,734	85	28.2	917.1	1.58	1.03
1980*	2,724	86	36.5	1,441.0	1.59	1.03
South Carolina						
1970	630	100	9.5	192.2	1.17	1.24
1974	1,264	103	15.4	454.3	1.33	1.34
1978	2,028	100	18.4	798.9	1.38	1.38
1980*	3,237	102	24.1	1,275.1	1.41	1.38
Tennessee						
1970	549	87	10.5	318.3	1.93	1.84
1974	923	75	14.7	642.8	1.89	1.99
1978	1,890	93	22.7	1,410.9	2.43	1.97
1980*	2,926	92	28.9	2,184.0	2.41	1.97
Texas						
1970	347	55	18.3	1,237.4	7.51	4.13
1974	751	61	30.2	2,959.4	8.68	4.45
1978	1,645	81	36.6	6,191.9	10.67	5.36
1980*	2,747	87	50.3	10,339.0	11.42	5.36
Virginia						
1970	693	110	9.0	225.0	1.37	1.53
1974	1,496	122	14.1	514.9	1.51	1.66
1978	2,217	109	15.6	826.7	1.42	1.68
1980*	3,647	115	21.1	1,359.8	1.50	1.68

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE INDUSTRIAL ENERGY EXPENDITURES (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in Wages	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures	% of Wages Salar
West Virginia						
1970	529	84	18.5	273.9	1.66	.90
1974	952	78	23.4	480.6	1.41	.93
1978	1,907	94	25.3	784.8	1.35	.98
1980*	2,640	83	28.9	1,086.4	1.20	.98
South Total						
1970	462	73	13.6	4,790.0	29.07	21.41
1974	946	77	21.5	10,913.2	32.02	23.07
1978	1743	86	26.7	20,830.1	35.88	24.76
1980*	2795	88	35.2	33,420.0	36.90	24.76
WEST						
Alaska						
1970	702	112	27.7	37.6	.23	.08
1974	1,248	102	39.1	76.6	.22	.09
1978	1,379	68	42.7	186.7	.32	.14
1980*	2,346	74	59.7	317.5	.35	.14
Arizona						
1970	812	129	12.7	123.5	.75	.59
1974	1,447	118	18.8	283.4	.83	.68
1978	2,313	114	24.1	518.3	.89	.68
1980*	3,911	124	33.6	876.5	.97	.68
California						
1970	666	106	7.5	1,119.1	6.79	9.09
1974	1,368	111	12.0	2,362.3	6.93	8.91
1978	2,485	122	14.4	4,167.8	7.18	9.17
1980*	3,851	122	18.4	6,459.1	7.13	9.17
Colorado						
1970	818	98	12.2	136.9	.83	.68
1974	1,120	96	16.5	295.0	.87	.81
1978	1,807	89	16.4	501.0	.86	.97
1980*	3,083	97	23.0	854.5	.94	.97
Hawaii						
1970	1,145	182	29.6	53.9	.33	.11
1974	2,023	165	50.9	112.6	.33	.10
1978	3,160	155	68.4	193.3	.33	.09
1980*	4,905	155	87.3	300.3	.33	.09

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE INDUSTRIAL ENERGY EXPENDITURES (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in Wages	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures	% of Wages Salar
Idaho						
1970	640	102	26.8	83.6	.51	.19
1974	1,012	82	31.3	149.9	.44	.22
1978	1,731	85	29.2	242.6	.42	.26
1980*	2,889	91	40.2	404.9	.45	.26
Kansas						
1970	615	98	18.2	204.6	1.24	.69
1974	1,122	91	24.7	421.6	1.24	.69
1978	2,016	99	29.5	796.7	1.37	.85
1980*	3,254	103	39.2	1,285.6	1.42	.85
Missouri						
1970	839	134	9.3	340.4	2.07	2.24
1974	1,511	123	14.1	655.9	1.92	2.12
1978	2,280	112	14.1	933.1	1.61	2.10
1980*	3,619	114	18.4	1,480.9	1.64	2.10
Montana						
1970	515	82	31.4	73.1	.44	.14
1974	982	80	45.8	150.0	.44	.15
1978	1,354	66	40.1	202.0	.35	.16
1980*	2,265	72	55.2	337.9	.37	.16
Nebraska						
1970	748	119	17.4	110.1	.67	.39
1974	1,404	114	28.4	252.4	.74	.40
1978	2,144	105	33.1	410.7	.71	.39
1980*	3,280	104	41.7	628.5	.69	.39
Nevada						
1970	722	115	30.6	33.3	.20	.07
1974	1,396	114	44.3	76.5	.22	.08
1978	2,108	104	45.9	140.9	.24	.10
1980*	3,546	112	63.5	237.0	.26	.10
New Mexico						
1970	493	78	34.2	94.6	.57	.17
1974	1,029	84	43.7	189.1	.55	.20
1978	1,898	93	39.6	313.5	.54	.25
1980*	3,345	106	57.4	552.5	.61	.25

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE INDUSTRIAL ENERGY EXPENDITURES (continued)

	Average Price/ Billion BTUs	Price Index	Energy Expenditures ¢/$1 in Wages	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures	% of Wages Salar
North Dakota						
1970	1,069	170	96.7	78.0	.47	.05
1974	1,920	156	94.8	133.5	.39	.06
1978	2,218	109	70.5	186.0	.32	.08
1980*	3,545	112	92.7	297.3	.33	.08
Oregon						
1970	568	90	8.8	125.6	.76	.87
1974	1,001	82	11.6	248.2	.73	.97
1978	1,598	78	13.7	463.8	.80	1.08
1980*	2,646	84	18.6	768.3	.85	1.08
South Dakota						
1970	1,331	212	46.2	61.1	.37	.08
1974	2,397	195	54.3	110.6	.32	.09
1978	2,702	133	59.3	193.2	.33	.10
1980*	4,471	141	80.6	319.5	.35	.10
Utah						
1970	529	84	18.8	98.2	.60	.32
1974	1,053	86	27.5	219.9	.65	.36
1978	1,678	82	28.4	374.8	.65	.42
1980*	3,123	99	43.5	697.6	.77	.42
Washington						
1970	421	67	8.8	203.2	1.23	1.40
1974	734	60	13.6	415.9	1.22	1.39
1978	1,099	54	13.1	636.2	1.1	1.54
1980*	1,452	46	14.2	840.3	.93	1.54
Wyoming						
1970	556	88	44.9	71.2	.43	.10
1974	993	81	51.4	140.3	.41	.12
1978	1,529	75	42.6	303.0	.52	.23
1980*	2,561	84	60.9	527.1	.58	.23
West Total						
1970	651	70	10.8	3,047.9	18.49	17.26
1974	1,236	101	16.3	6,293.9	18.46	17.54
1978	2,017	99	18.3	10,763.9	18.54	18.61
1980*	3,167	100	22.9	16,906.0	18.67	18.61

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE TRANSPORTATION ENERGY EXPENDITURES

	$/Billion BTUs	Price Index	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures
NATIONAL TOTAL				
1970	$2,235	100	$35,936.9	100%
1974	3,522	100	63,582.0	100
1978	4,631	100	95,511.5	100
1980	8,622	100	177,815.5	100
NORTHEAST				
Connecticut				
1970	2,640	118	478.7	1.33
1974	4,060	115	800.5	1.10
1978	5,117	110	1,048.8	1.10
1980	8,801	102	1,803.9	1.01
Maine				
1970	2,327	104	205.0	.57
1974	3,687	105	352.7	.55
1978	4,807	104	479.9	.50
1980	8,860	103	884.5	.50
Massachusetts				
1970	2,406	108	828.5	2.31
1974	3,775	107	1,383.2	2.18
1978	4,758	103	1,824.8	1.91
1980	8,951	104	3,433.2	1.93
New Hampshire				
1970	2,686	120	138.1	.38
1974	4,081	116	229.8	.36
1978	5,047	109	325.0	.34
1980	9,239	107	594.8	.33
Rhode Island				
1970	2,178	97	136.8	.38
1974	3,839	109	223.8	.35
1978	4,990	108	271.1	.28
1980	9,392	109	510.2	.29
Vermont				
1970	2,917	131	85.6	.24
1974	4,285	122	139.9	.22
1978	4,969	107	188.9	.20
1980	8,449	98	355.2	.20

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE TRANSPORTATION ENERGY EXPENDITURES

	$/Billion BTUs	Price Index	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures
Delaware				
1970	2,211	99	111.8	.31
1974	3,382	96	191.5	.30
1978	4,430	96	251.5	.26
1980	9,505	110	482.9	.27
Maryland				
1970	2,297	103	628.9	1.75
1974	3,638	103	1,088.3	1.71
1978	4,782	103	1,569.3	1.64
1980	8,692	101	2,852.5	1.60
New Jersey				
1970	2,385	107	1,179.7	3.28
1974	3,707	105	1,970.3	3.10
1978	4,469	97	2,554.2	2.67
1980	8,717	101	4,981.6	2.80
New York				
1970	2,194	98	2,337.8	6.51
1974	3,802	108	3,969.3	6.24
1978	4,801	104	5,169.5	5.41
1980	8,958	104	9,646.2	5.42
Pennsylvania				
1970	2,395	107	1,702.8	4.74
1974	3,674	104	2,844.5	4.47
1978	4,475	97	3,862.1	4.04
1980	8,806	102	7,599.2	4.27
Northeast Total				
1970	2,337	105	7,833.6	21.8
1974	3,759	107	13,194.2	20.8
1978	4,690	101	17,903.0	18.7
1980	8,859	103	33,144.4	18.6
MIDWEST				
Illinois				
1970	2,405	108	1,880.9	5.23
1974	3,675	104	3,187.9	5.01
1978	5,010	108	4,825.4	5.05
1980	9,357	109	9,012.1	5.07

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE TRANSPORTATION ENERGY EXPENDITURES

	$/Billion BTUs	Price Index	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures
Indiana				
1970	2,575	115	974.7	2.71
1974	3,780	107	1,638.5	2.58
1978	5,010	108	2,373.5	2.49
1980	9,357	109	4,311.4	2.24
Iowa				
1970	2,361	106	496.1	1.38
1974	3,570	101	872.0	1.37
1978	4,992	108	1,294.0	1.35
1980	9,277	108	2,404.5	1.35
Michigan				
1970	2,453	110	1,460.2	4.06
1974	3,984	113	2,645.6	4.16
1978	5,033	109	3,654.5	3.82
1970	9,788	114	7,107.6	4.00
Minnesota				
1970	2,577	115	704.9	1.96
1974	3,731	106	1,174.6	1.85
1978	5,027	109	1,742.9	1.82
1980	9,330	108	3234.7	1.82
Ohio				
1970	2,595	116	1,758.1	4.89
1974	3,919	111	2,946.7	4.63
1978	4,759	103	3,973.2	4.16
1980	9,060	105	7,564.3	4.25
Wisconsin				
1970	2,410	108	650.8	1.81
1974	3,874	110	1,191.8	1.87
1978	4,814	104	1,726.3	1.81
1980	9,105	106	3,264.8	1.89
MIDWEST TOTAL				
1970	2,488	111	7,925.7	22.1
1974	3,810	108	13,657.0	21.5
1978	4,956	107	19,589.9	20.5
1980	9,336	108	36,899.3	20.8

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE TRANSPORTATION ENERGY EXPENDITURES

	$/Billion BTUs	Price Index	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures
SOUTH				
Alabama				
1970	2,265	101	611.5	1.70
1974	3,249	92	1,140.3	1.79
1978	4,429	96	1,817.4	1.90
1980	8,156	95	3,351.0	1.88
Arkansas				
1970	2,199	98	371.6	1.03
1974	3,376	96	722.3	1.14
1978	4,708	102	1,084.3	1.14
1980	8,462	98	1,948.8	1.10
Washington, D.C.				
1970	2,709	121	89.0	.25
1974	3,832	109	150.0	.24
1978	4,826	104	168.3	.18
1980	8,997	104	313.7	.18
Florida				
1970	2,230	100	1,343.8	3.74
1974	3,541	101	2,588.7	4.07
1978	4,540	98	3,972.4	4.16
1980	8,977	104	7,855.7	4.42
Georgia				
1970	2,312	103	920.8	2.56
1974	3,615	103	1,724.8	2.71
1978	4,794	104	2,610.6	2.73
1980	8,944	104	4,870.5	2.74
Kentucky				
1970	2,228	100	583.3	1.62
1974	3,515	100	1,019.9	1.60
1978	4,627	100	1,539.3	1.61
1980	8,426	98	2,823.2	1.59
Louisiana				
1970	1,674	75	659.0	1.83
1974	2,637	75	1,345.8	2.12
1978	3,677	79	2,197.4	2.30
1980	6,329	79	4,082.1	2.30

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE TRANSPORTATION ENERGY EXPENDITURES

	$/Billion BTUs	Price Index	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures
Mississippi				
1970	1,885	84	409.9	1.14
1974	2,966	84	733.5	1.15
1978	4,180	90	1,082.2	1.13
1980	7,831	91	2,027.1	1.14
North Carolina				
1970	2,470	111	911.3	2.54
1974	3,799	108	1,633.1	2.57
1978	4,855	105	2,349.7	2.46
1980	8,949	104	4,330.1	2.44
Oklahoma				
1970	2,231	100	548.4	1.53
1974	3,406	97	921.7	1.45
1978	4,754	103	1,519.0	1.60
1980	8,437	98	2,695.7	1.52
South Carolina				
1970	2,275	102	469.2	1.31
1974	3,800	108	887.0	1.40
1978	4,676	101	1,251.7	1.31
1980	8,994	104	2,407.6	1.35
Tennessee				
1970	2,887	129	705.0	1.96
1974	3,376	96	1,286.3	2.02
1978	4,784	103	2,104.4	2.20
1980	8,794	102	3,867.9	2.18
Texas				
1970	1,953	87	2,363.2	6.58
1974	2,993	85	4,491.0	7.06
1978	4,108	89	7,556.1	7.91
1980	7,626	88	14,026.5	7.89
Virginia				
1970	1,985	89	885.5	2.46
1974	3,435	98	1,638.8	2.58
1978	4,708	102	2,426.2	2.54
1980	8,449	98	4,353.8	2.45

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE TRANSPORTATION ENERGY EXPENDITURES

	$/Billion BTUs	Price Index	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures
West Virginia				
1970	2,417	108	262.0	.73
1974	3,383	96	469.3	.74
1978	4,519	98	692.0	.73
1980	8,550	99	1,311.1	.74
South Total				
1970	2,125	95	11,133.5	31.0
1974	3,299	94	20,752.4	32.6
1978	4,433	96	32,371.7	33.9
1970	8,252	96	60,264.8	33.9
WEST				
Alaska				
1970	1,126	50	95.0	.26
1974	2,562	76	201.7	.32
1978	3,881	84	382.5	.40
1980	7,054	82	695.4	.39
Arizona				
1970	1,991	89	392.5	1.09
1974	3,204	91	748.9	1.13
1978	4,612	100	1,237.3	1.30
1980	8,221	95	2,205.5	1.24
California				
1970	2,126	95	3,911.4	10.88
1974	3,539	100	6,719.9	10.57
1978	4,561	99	10,969.3	11.48
1980	8,509	98	20,462.3	11.51
Colorado				
1970	2,215	99	428.6	1.19
1974	3,595	102	825.1	1.30
1978	4,798	104	1,329.0	1.39
1980	8,679	101	2,404.1	1.35
Hawaii				
1970	1,463	65	190.2	.53
1974	2,636	75	350.3	.55
1978	4,087	88	601.4	.53
1980	7,280	89	1,071.3	.60

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE TRANSPORTATION ENERGY EXPENDITURES

	$/Billion BTUs	Price Index	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures
Idaho				
1970	2,311	103	155.1	.43
1974	3,576	102	283.8	.45
1978	4,839	104	453.7	.48
1980	8,887	103	833.2	.47
Kansas				
1970	1,694	76	430.0	1.20
1974	2,776	79	763.3	1.20
1978	3,932	85	1,132.6	1.19
1980	7,485	87	2,156.4	1.21
Missouri				
1970	2,240	100	884.4	2.46
1974	3,688	105	1,544.0	2.43
1978	4,839	104	2,253.9	2.36
1980	9,053	105	4,216.7	2.37
Montana				
1970	2,338	105	160.0	.45
1974	3,549	101	304.0	.48
1978	4,787	103	464.8	.49
1980	8,679	101	842.7	.47
Nebraska				
1970	2,293	103	320.8	.89
1974	3,464	98	529.5	.83
1978	4,657	101	799.8	.84
1980	8,412	98	1,389.6	.78
Nevada				
1970	2,191	98	154.3	.43
1974	3,402	97	285.6	.45
1978	4,656	101	520.5	.55
1980	8.412	98	940.4	.53
New Mexico				
1970	1,834	82	256.3	.71
1974	2,917	83	466.1	.73
1978	4,183	90	730.0	.76
1980	7,962	92	1,389.6	.78

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

STATE TRANSPORTATION ENERGY EXPENDITURES

	$/Billion BTUs	Price Index	Energy Expenditures Total (millions)	% of U.S. Energy Expenditures
North Dakota				
1970	2,188	98	123.7	.34
1974	3,506	100	220.6	.35
1978	4,853	105	356.8	.37
1980	8,943	104	657.4	.37
Oregon				
1970	2,338	105	424.0	1.18
1974	3,584	115	756.2	1.19
1978	4,566	99	1,202.0	1.26
1980	8,476	98	2,231.0	1.25
South Dakota				
1970	2,529	113	139.9	.39
1974	3,770	107	231.9	.36
1978	4,942	107	343.8	.36
1980	9,246	107	643.1	.36
Utah				
1970	2,290	102	206.9	.58
1974	3,529	100	390.4	.61
1978	4,664	101	598.9	.63
1980	8,929	104	1,146.5	.64
Washington				
1970	2,260	101	658.4	1.83
1974	3,471	99	1,140.2	1.79
1978	4,646	100	1,900.3	1.99
1980	8,369	97	3,423.0	1.93
Wyoming				
1970	1,959	88	112.0	.31
1974	3,142	89	216.2	.34
1978	4,369	94	370.2	.39
1980	8,096	94	685.9	.39
WEST TOTAL				
1970	2,103	94	9,044.1	25.2
1974	3,422	97	15,978.3	25.1
1978	4,558	99	25,647.0	26.35
1980	8,443	98	47,507.0	25.7

*1980 FIGURES DERIVED BY MULTIPLYING 1978 CONSUMPTION FIGURES BY ESTIMATED 1980 PRICES.

METHODOLOGY - STATE RESIDENTIAL ENERGY EXPENDITURES

The basic sources of these statistics were the State Energy Data Report (April 1980) published by the U.S. Department of Energy's Energy Information Administration and the EIA State Physical Unit Database, which provides state-level prices by sector (residential, commercial, industrial, and transportation) and fuel type. Residential energy recorded by the EIA includes coal (bituminous and lignite, and anthracite), natural gas, distillate, kerosene, liquid petroleum gases, and electricity. State-level fuel prices are available for all except coal for the residential sector.

Total State Residential Energy Expenditures. To calculate total state expenditures for residential energy, consumption by fuel type in physical units was multiplied by cost per fuel type in physical units adjusted to equal consumption units. For example, consumption of distillate fuel per state is recorded in 1,000 barrels. Price, on the other hand, is recorded per gallon. The price was multiplied by 42 (gallons per barrel) times 1,000 to find the price per 1,000 barrels of distillate. The consumption of distillate then was multiplied by the price. The total price paid for residential energy was calculated by adding up the prices for different fuel types except for coal. Coal consumption in the residential sector was less than one percent for all except 12 states. The percentage of expenditures for which prices exist for these states is as follows:

	1970	1974	1978
Idaho	96.9	96.6	97.7
Kentucky	97.8	98.5	98.0
North Carolina	98.8	98.9	99.4
North Dakota	97.4	97.0	95.8
Ohio	98.1	98.4	98.5
Pennsylvania	94.6	96.4	96.2
South Carolina	98.5	98.7	99.2
Utah	98.6	96.5	97.2
Virginia	98.4	97.9	99.4
West Virginia	98.3	96.4	98.2
Wisconsin	96.8	98.8	99.4
Wyoming	99.4	99.0	94.6

Average State Expenditure per Household. The total state expenditure for residential energy consumption was divided by the number of households per state for the years 1970, 1974, and 1978 to find the average household expenditure per state. The number of households per state was taken from the Statistical Abstract of the United States, 1976, 1978, and 1979, published by the Department of Commerce, Bureau of the Census. Household expenditures were standardized by dividing price by percent expenditures covered multiplied by 100. In other words, for the state of Idaho, household expenditures were divided by 96.9 in 1970 and multiplied by 100. For 1974, they were divided by 96.6 times 100, etc. The U.S. average household expenditure was calculated in the same way. An index of household expenditures was calculated by dividing the state household expenditure average by the national household expenditure average times 100.

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Price per Billion BTUs. To compare average price for a standard unit of energy in different states, the price paid by state for a billion British Thermal Units (BTUs) was calculated by dividing total state expenditures by total BTUs consumed. The dollar amount per billion BTUs was adjusted for the percentage expenditures covered as explained above. The price index was calculated by dividing the state cost by the national average cost and multiplying by 100.

Billion BTUs per Household. The average number of BTUs consumed per household was arrived at by dividing the total number of BTUs consumed in a state by the number of households per state for that year.

Regional Average Household Expenditures. Regional average household expenditures were calculated by multiplying the states' percentage of households in a region by the average energy expenditures for those states and adding them up to find the regional total.

1980 Estimates. The 1980 estimates were calculated on the basis of the most recent data available: 1978 consumption figures and estimated 1980 prices. The 1980 prices were calculated by taking 1979 state level prices (available from EIA's price database) for different fuel types, adjusted for national average price increases through October 1980. The one exception to this was the use of regional price increases that were available for distillate. The percentage increase in kerosene prices was assumed to be the same as that for distillate. The percentage price increase for liquid petroleum gas was calculated from the price increase reported for propane. All price increase data was taken from the Monthly Energy Review (January 1981), published by the Energy Information Administration.

METHODOLOGY - STATE COMMERCIAL ENERGY EXPENDITURES

These statistics also were based on the EIA State Energy Data Report (April 1980) and State Physical Unit Database. Commercial energy consumption recorded by EIA includes: coal, natural gas, asphalt, distillate, LPG (liquid petroleum gas), motor gasoline, residual fuel, coal oil, and electricity. Of these categories, the State Physical Unit Database provides state level prices for the following fuel types: natural gas, distillate, residual fuel, and electricity. Coal prices by state were estimated based on the spot price paid by utilities. For asphalt and coal oil, only national average prices were available. For LPG, residential sector prices were used. State-by-state motor gasoline prices were used for the commercial sector. The methodology used by EIA in its compilation of state energy prices is discussed in State Energy Fuel Prices by Major Economic Sector from 1960 through 1977 (July 1979).

Total State Commercial Energy Expenditures. To calculate total state expenditures, consumption by fuel type in BTUs was multiplied by cost per fuel type in BTUs. Then the total price paid for commercial energy was calculated by adding up the prices for different fuel types.

Average State Expenditures in Cents per Dollar of Wages. To compare the commercial energy expenditures per state, the total wages and salaries for the commercial sector in that state were compiled. The total state expenditure for energy then was divided by total wages and salaries to arrive at the amount of energy expenditures per dollar of wages. To insure comparability, wages and salaries for the commercial sector were standardized to reflect EIA's definition of commercial sector. Specifically, this includes: retail; wholesale; real estate, financing and banking; services; government, and heavy construction. Wages and salaries data was obtained from the Bureau of Economic Analysis, Department of Commerce. An index of energy expenditures per dollar of wages and salaries was calculated by dividing the state expenditure average by national average times 100.

Price per Billion BTUs. This figure was computed in the same way as the price per billion BTUs for residential energy expenditures.

Percent of Total Wages and Salaries. This figure was determined by dividing state totals by the national total.

Percent of Total Energy Expenditures. This figure was calculated by dividing state totals by the national total for commercial energy expenditures.

1980 Estimates. The 1980 estimates were calculated on the basis of the most recent data available: 1978 consumption figures and estimated 1980 prices. The 1980 prices were calculated by taking 1979 state-level prices (available from EIA's price database) for different fuel types, adjusted for national average price increases through 1980. The national percentage increases were obtained from Monthly Energy Review, published by EIA. Wages and salaries by state also were multiplied by national average wage increases taken from Economic Indicators (May 1981), prepared for the Joint Economic Committee by the Council of Economic Advisers.

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METHODOLOGY - STATE TRANSPORTATION ENERGY EXPENDITURES

The basic sources and the methodology used for the transportation sector were the same as for the other sectors, except as noted below. The EIA database has no state-specific data for the transportation sector, with the exception of motor gasoline prices. To estimate transportation expenditures, the following fuel prices were used:

Coal - Industrial coal prices were used.

Natural Gas - This figure was reached using the wellhead price taken from the *Minerals Yearbook*, Volume I, U.S. Department of the Interior, for 1970 and 1974. 1978 prices were taken from Energy Data Reports, *Natural Gas Annual*, published by the Energy Information Administration. 1980 prices were estimated by taking the national average percent increase in wellhead gas prices between 1978-1980 from the *Monthly Energy Review*.

Aviation Gas - Aviation gas prices were estimated by substituting state prices for motor gasoline.

Distillate Fuel - Industrial distillate fuel prices were used to compute this figure.

Jet Fuel - The national average price for jet fuel was used for all states.

LPG - Prices for LPG for the industrial sector were used.

Lubricants - The national average price for lubricants was used for all states.

Motor Gasoline - prices were available by state.

Residual Fuel - Prices for the industrial sector by state were used.

Electricity Sales - Prices for electricity for the transportation sector were obtained from the Edison Electric Institute's *Statistical Yearbook of the Electric Utility Industry*. Data was available for only 15 states, so volume-weighted regional prices (Census Divisions) were used for the remaining states. 1980 prices were estimated by inflating 1978 figures by the national percentage increase between 1978-1980 taken from the *Monthly Energy Review*, using the average price of retail electricity for the "other" sector.

The methodology for arriving at average transportation costs per household was the same as that used for the residential sector.

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METHODOLOGY - STATE INDUSTRIAL ENERGY EXPENDITURES

The methodology and the data sources for industrial state energy expenditures were the same as those for the commercial sector, except as noted below. The industrial use of energy includes the following fuels: coal, natural gas, distillate fuel, jet fuel, kerosene, liquid petroleum gases (LPG), lubricants, motor gasoline, residual fuel, other petroleum products, hydroelectric, and electricity. Of these fuels, the State Physical Unit Database provides state-level prices for the following fuel types: coal, natural gas, LPG, kerosene, residual fuel, and electricity. The national average price was used for jet fuel and lubricants. State gasoline prices were used for motor gas. State residual fuel prices were used for other petroleum prices, and state electricity prices were used for hydroelectric prices.

Total State Industrial Energy Expenditures. The methodology used to compute this was the same as described for the commercial sector.

Average State Expenditures in Cents per Dollar of Wages. Computed in the same way as commercial sector expenditures, the total wages and salaries included those of the manufacturing and mining categories.

The rest of the statistics were computed in the same way as those of the commercial sector.

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State Electricity Prices
By Sector for 1980
(Dollars/Million BTUs)

State	Residential	Commercial	Industrial
New Jersey	$22.98	$21.15	$15.88
Hawaii	$22.61	$24.90	$17.45
New York	$22.23	$21.94	$11.32
Rhode Island	$21.61	$19.38	$17.24
Massachusetts	20.33	20.20	16.26
Connecticut	19.31	18.61	15.21
New Hampshire	19.27	21.18	14.76
Delaware	19.23	19.29	13.59
Maine	17.23	18.02	12.24
Arizona	17.11	15.54	10.67
New Mexico	16.95	13.54	12.59
Illinois	16.71	15.78	11.09
California	16.44	16.87	14.56
Pennsylvania	16.43	15.64	12.03
Virginia	16.12	14.41	11.31
District of Columbia	16.07	16.99	10.89
Maryland	16.06	17.00	10.90
Michigan	15.74	16.08	12.31
Utah	15.60	12.40	9.30
Florida	15.59	14.57	12.60
Ohio	15.05	14.57	9.13
United States Average	14.37	13.96	10.20
Kansas	14.25	9.75	9.75
Iowa	14.23	14.55	9.55
Vermont	14.18	13.53	9.74
Texas	13.81	12.78	9.24
Missouri	13.80	13.06	10.31
Nevada	13.65	14.09	10.86
Wisconsin	13.61	13.96	9.28
Colorado	13.28	12.19	8.95
Alabama	13.06	14.66	9.64

STATE	Residential	Commercial	Industrial
Arkansas	$13.06	$12.42	$8.44
Mississippi	12.87	[illegible]	10.60
Georgia	12.81	14.04	9.87
Alaska	12.74	13.62	10.02
Indiana	12.52	12.03	10.16
South Carolina	12.41	11.10	7.97
North Carolina	12.35	11.01	8.35
Minnesota	12.34	12.14	10.24
West Virginia	12.07	11.89	8.03
Oklahoma	11.98	10.84	8.18
Louisiana	11.80	10.90	8.39
Nebraska	11.57	10.34	7.45
South Dakota	11.49	11.14	8.58
North Dakota	11.04	9.81	9.16
Kentucky	10.87	8.11	8.02
Tennessee	9.98	12.54	9.09
Wyoming	8.64	6.90	4.79
Oregon	8.60	7.82	4.35
Idaho	8.03	7.53	5.11
Montana	7.91	7.40	2.77
Washington	5.16	5.12	2.09
Percent difference	345 percent	329 percent	825 percent

Electricity As A Percent of Total Energy
Consumption by Sector, 1960-80

	1960	1970	1980	Percent Change 1960-80
Residential	29.0	40.8	54.9	+89.3
Commercial	38.7	49.2	61.5	+58.9
Industrial	18.3	23.2	31.5	+72.1

Source: Energy Information Administration, State Energy Data Series, 1980, (Washington, D.C.), July, 1982.

Senator SPECTER. Mr. Chairman, let me now turn to an even more pleasant subject. That is the introduction of William Scranton, the very distinguished Lieutenant Governor from the Commonwealth of Pennsylvania.

Governor Scranton comes to his current position after a superb educational background at Yale University, after experience as a newspaper editor, after substantial experience in the public realm having been very actively engaged in the statewide campaign of President Ford in 1976 where I worked with him, and our paths have crossed continuously from the time before he came into public life when I saw a great deal of him as the son of a very distinguished Governor, William Scranton, the elder.

He comes from a great family tradition of public service. In the course of 3 years and 6 months and 29 days as a Lieutenant Governor of Pennsylvania, he has established a really outstanding record.

One of the responsibilities that he has taken on in his illustrious partnership with Governor Thornburgh who has done such an outstanding job for the Commonwealth of Pennsylvania, one of the items which has been placed upon the mantel of the Lieutenant Governor has been the energy issue which has been a very big one in Pennsylvania given all the problems of energy, but especially those which are attendant to Three Mile Island.

As he progresses on his current effort for reelection for the Lieutenant Governorship of Pennsylvania, a task that I think is certain to be successful, there is much more in Lieutenant Governor Scranton's future, and as this hydropower authority moves its way through the legislative halls, I would not wish to predict what sort of problems will confront Bill Scranton in a variety of offices which he may hold in the future for the benefit not only of Pennsylvania but for the United States.

Senator MURKOWSKI. I thank you, Senator, for that very generous and extremely thorough introduction. It must be that you are either extremely well briefed or are very close friends and either of which, it is a pleasure.

We invited Governor Thornburgh, and I am very pleased that this morning we have Hon. William Scranton III, Lieutenant Governor of the Commonwealth of Pennsylvania. I do have a few questions, Senator, but I will save the questions for the conclusion of the Lieutenant Governor's statement. You may proceed.

Lieutenant Governor Scranton. Thank you, Mr. Chairman. Good morning. I have supplied your staff with a formal copy of my remarks, and what I would like to do is summarize them for you at this time.

Senator MURKOWSKI. Your entire statement will be submitted for the record.

Lieutenant Governor SCRANTON. Thank you.

STATEMENT OF HON. WILLIAM W. SCRANTON III, LIEUTENANT GOVERNOR, COMMONWEALTH OF PENNSYLVANIA

Lieutenant Governor SCRANTON. As Senator Specter has pointed out, I come not only as a representative of Governor Thornburgh as the Lieutenant Governor of Pennsylvania, but also as chairman of the Governor's energy council, and I want to today give you a little bit of past perspective on hydropower which we consider an extremely valuable resource. It must be developed for the future of our State.

During the past several years, there has been a dramatic increase in the interest in the development of hydroelectric facilities in our State as elsewhere for a number of reasons—one, because obviously of the large increases in fossil fuel costs, because of inflation and high interest rates which have caused very sharp increases in investment costs associated with fossil fuel and nuclear plants, because of the very quick maturation of hydropower equipment industry and technology, and also because Congress has passed several pieces of incentive legislation for hydroelectric development.

Among these incentives have been the Public Utility Regulatory Policy Act of 1978 which provided a guaranteed market for electricity generated from hydro, and the Windfall Profits Tax Act of 1980 which provided an 11-percent business energy credit for qualifying hydroelectric property. This credit is in addition to the existing 10-percent investment tax credit. These factors have combined to make hydroelectric development a potentially profitable commercial enterprise.

In terms of economic efficiency, hydropower has several advantages over traditional thermal power. First, the environmental impact of hydroelectric facilities is minimal.

Second, the useful life of hydro structures is two to three times longer than that of thermal plants.

Third, conventional hydropower consumes no fuel, which of course, is a major cost item at thermal power generation.

Fourth, hydropower efficiency is more than twice that of thermal plants.

Fifth, operation and maintenance costs are lower and hydropower is capable of almost instantaneous response to increased load demand.

Pennsylvania utilities currently operate nine hydroelectric facilities which, in 1979, accounted for 6 percent of the State's electrical generation capacity, and 1.9 percent of the State's electricity. The total potential for hydropower in Pennsylvania, however, is much greater. Recently, we published the Pennsylvania Renewable Energy Assessment, a copy of which I have here and I have provided for members of your staff, which is, to the best of our knowledge, the first comprehensive inventory of alternate energy sources available in any State, and we have identified in this document a total hydro potential of over 4,000 megawatts of generating capacity for Pennsylvania. If totally developed, these sites will provide 9 percent of the State's total 1989 electrical generation, but in the near term, 1,400 megawatts of Pennsylvania hydro potential can be developed at 71 existing dams, and this would be equivalent to the electricity generated at two units at Three Mile Island if they were operating.

These would be relatively small projects. As Senator Specter pointed out, lowhead hydro projects are undertaken mostly by private developers and municipalities. As of April 1982, the Federal Energy Regulatory Commission had 166 applications to develop 72 separate hydro sites in Pennsylvania. Development of hydroelectric power, while very promising, has proceeded slowly. However, there are still both economic and institutional barriers that must be addressed.

In my opinion, the single most important issue for the development of hydropower is access to capital at reasonable cost. Hydroelectric projects are expensive, and of course, capital-intensive. A new hydro facility can cost over $2,000 per kilowatt installed. Hydropower projects are capital-intensive even though they require no fuel and little maintenance or operating expense; 82 to 93 percent of the annual cost of hydroelectric power are the costs of interest, taxes, and debt payment. That could be compared to 68 or 78 percent for nuclear facilities, and 48 to 66 percent for coal-fired plants.

Capital intensiveness can be a particular problem where private firms rather than utility companies are faced with high interest rates, and we assume in Pennsylvania that many of these hydroelectric sites would be developed by private companies.

In our State, we have proposed in response to this problem the Pennsylvania Energy Development Authority which would use revenues from sales tax from the sales of tax-exempt bonds to finance the development of hydro as well as other energy projects. There are, however, other concerns other than just capital, capital development. Among them is the licensing of the project at the State and Federal level which is currently a very complex problem.

The procedure is a long and involved decisionmaking process that includes a very large number of participants. For instance, the development of a hydro project is evaluated from the angle of recreation, water quality, irrigation, fish and wildlife enhancement, and overall environmental effects. We in Pennsylvania are currently streamlining the many State laws and regulations, some of which, of course, include the following—Dam Safety Act, flood plain management regulations, water quality standards, fish passageway requirement, River Basin Commission rules, et cetera.

Other recommendations have been made which would encourage greater use of hydroelectric power. For instance, the department of environmental resources lacks currently the authority to lease potential dam sites for hydro development. One of our recommendations would allow the Pennsylvania department of environmental resources to develop the hydroelectric potential at 88 dams which are currently owned by State, and to contract with private parties to develop the State hydro capability.

Other legislative proposals would provide favorable tax treatment to small-scale hydro facilities.

In conclusion, there is in Pennsylvania in our opinion a very large and important potential for hydroelectric development. Obstructing that potential are barriers which we feel Government has a right and also an obligation to address given the current State of the economy, the costs of energy, and the energy security situation.

We have proposed incentives in Pennsylvania and would most welcome Federal participation. Much remains to be done at both the state and Federal level if hydro is to fulfill its tremendous promise. I congratulate Senator Specter for recognizing the potential of the northeast, in the northeast for hydropower, and thank the subcommittee for allowing me the opportunity to give Pennsylvania's perspective.

[The prepared statement of Lieutenant Governor Scranton follows:]

PREPARED STATEMENT OF HON. WILLIAM W. SCRANTON III, LIEUTENANT GOVERNOR, COMMONWEALTH OF PENNSYLVANIA

I THANK THE CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE ON WATER AND POWER FOR ALLOWING ME TO GIVE PENNSYLVANIA'S PERSPECTIVE ON HYDRO POWER. IN ADDITION TO THE CONSTITUTIONAL RESPONSIBILITIES OF LIEUTENANT GOVERNOR, I SERVE AS THE CHAIRMAN OF THE GOVERNOR'S ENERGY COUNCIL.

THIS POSITION HAS PUT ME AT THE FOREFRONT OF HANDLING MANY FACETS OF THE ENERGY PROBLEM NOTABLY THE GASOLINE SHORTAGES OF 1979 AND THE ACCIDENT AT THREE MILE ISLAND. THESE EXPERIENCES CONVINCED ME THAT PENNSYLVANIA COULD NOT CONTINUE TO CONDUCT BUSINESS AS USUAL.

THE PENNSYLVANIA ENERGY POLICY STRESSES INCREASED USE OF PENNSYLVANIA'S NATURAL RESOURCES AND MORE EFFICIENT AND EFFECTIVE USE OF ALL ENERGY SOURCES. IT CALLS FOR INCREASING THE STATE'S COAL AND NATURAL GAS PRODUCTION, EXPANDING ENERGY CONSERVATION EFFORTS AND DEVELOPING RENEWABLE ENERGY RESOURCES. HYDRO POWER IS AN IMPORTANT BUILDING BLOCK OF THIS POLICY.

DURING THE PAST SEVERAL YEARS THERE HAS BEEN A DRAMATIC INCREASE IN INTEREST IN THE DEVELOPMENT OF HYDROELECTRIC FACILITIES. THIS HAS OCCURED BECAUSE:

A) LARGE INCREASES IN THE PRICE OF FOSSIL FUELS HAVE FORCED EXAMINATION OF ALTERNATIVE MEANS OF GENERATING ELECTRICITY. FOR EXAMPLE, 1970 ELECTRIC UTILITIES PRODUCTION EXPENSE, WHICH WAS MADE UP MOSTLY OF FUEL COSTS, ACCOUNTED FOR ABOUT

36% OF THE TOTAL EXPENSES. IN 1978, THE PRODUCTION EXPENSES WERE ESTIMATED TO BE ABOUT 58% OF TOTAL EXPENSES.

B) INFLATION AND HIGH INTEREST RATES HAVE CAUSED SHARP INCREASES IN INVESTMENT COSTS ASSOCIATED WITH THE SITING AND CONSTRUCTION OF FOSSIL FUEL AND NUCLEAR PLANTS INCLUDING COST INCREASES ASSOCIATED WITH THE EQUIPMENT AND OPERATING COSTS FOR AIR POLLUTION CONTROL. IN ADDITION, THE SITING OF LARGE BASELOAD GENERATING UNITS HAS BECOME INCREASINGLY DIFFICULT.

C) THE HYDRO POWER EQUIPMENT INDUSTRY AND TECHNOLOGY HAS MATURED. A WIDE VARIETY OF EQUIPMENT AND SERVICES IS READILY AVAILABLE FROM A WELL ESTABLISHED AND EXPERIENCED INTERNATIONAL HYDROPOWER INDUSTRY. ONE OF THE WORLD'S LARGEST MANUFACTURER'S OF HYDRO EQUIPMENT, ALLIS-CHALMERS, IS HEADQUARTERED IN YORK, PENNSYLVANIA.

D) CONGRESS HAS PASSED SEVERAL PIECES OF INCENTIVE LEGISLATION FOR HYDRO DEVELOPMENT.

THE PUBLIC UTILITY REGULATORY POLICY ACT (PURPA) OF 1978 (SECTION 210) PROVIDED A GUARANTEED MARKET FOR ELECTRICITY GENERATED FROM HYDRO. THE EFFECT OF THE SECTION 210 LANGUAGE IS TO REQUIRE PRIVATE ELECTRIC UTILITIES TO BUY SMALL-HYDRO OPERATIONS THE "AVOIDED COSTS" OF ELECTRIC POWER WHICH IS THE

PRICE THEY WOULD HAVE TO PAY TO GENERATE THE EXTRA POWER THEMSELVES.

THE CRUDE OIL WINDFALL PROFITS TAX ACT OF 1980 PROVIDED AN 11% BUSINESS ENERGY CREDIT FOR QUALIFYING HYDROELECTRIC PROPERTY. THIS CREDIT IS IN ADDITION TO THE EXISTING 10% INVESTMENT TAX CREDIT. A TAX CREDIT OF 21% MEANS $2.1 MILLION ON A $10 MILLION PROJECT TO AN INVESTOR.

THESE FACTORS HAVE COMBINED TO MAKE HYDROELECTRIC DEVELOPMENT ATTRACTIVE AS A SECURE, CLEAN ENERGY SOURCE AND AS A POTENTIALLY PROFITABLE COMMERCIAL ENTERPRISE.

THERE ARE SOME GENERALIZATIONS THAT CAN BE MADE ABOUT THE ECONOMIC AND RESOURCE EFFICIENCY OF HYDROPOWER. IN TERMS OF ECONOMIC EFFICIENCY, HYDROPOWER HAS SEVERAL ADVANTAGES OVER THERMAL POWER.

A) THE ENVIRONMENTAL IMPACT OF DEVELOPING HYDRO FACILITIES AT EXISTING DAMS IS MINIMAL.

B) THE USEFUL LIFE OF HYDRO STRUCTURES IS TWO TO THREE TIMES LONGER THAN THAT OF THERMAL PLANTS,

C) CONVENTIONAL HYDROPOWER CONSUMES NO FUEL (A MAJOR COST ITEM FOR THERMAL POWER GENERATION),

D) HYDROPOWER EFFICIENCY IS ABOUT 85%: MORE THAN TWICE THAT OF A THERMAL PLANT,

E) OPERATION AND MAINTENANCE COSTS ARE LOWER BECAUSE EQUIPMENT IS LESS COMPLEX, AND

F) HYDROPOWER IS CAPABLE OF ALMOST INSTANTANEOUS RESPONSE TO INCREASED LOAD DEMANDS.

G) BECAUSE MOST NEW HYDRO DEVELOPMENTS WILL BE OF MODEST SIZE THEY CAN BE INTEGRATED WITH THE OVERALL ELECTRIC SUPPLY SYSTEM IN A MANNER THAT MORE CLOSELY MATCHES DEMAND GROWTH THAN DO THE TYPICAL LARGE CENTRALIZED THERMAL PLANTS.

FORTUNATELY, PENNSYLVANIA IS ENDOWED WITH A PLENTIFUL HYDRO RESOURCE. OUR ELECTRIC UTILITIES CURRENTLY OPERATE NINE HYDROELECTRIC FACILITIES WHICH, IN 1979, ACCOUNTED FOR 6% OF THE STATE"S ELECTRIC GENERATION CAPACITY AND 1.9% OF THE STATE'S ELECTRICITY. THE TOTAL POTENTIAL FOR HYDROPOWER IN THE COMMONWEALTH IS MUCH GREATER, HOWEVER. IN OUR RECENTLY PUBLISHED PENNSYLVANIA RENEWABLE ENERGY RESOURCE ASSESSMENT - ONE OF THE FIRST SUCH COMPREHENSIVE INVENTORIES OF ALTERNATIVE ENERGY SOURCES YET UNDERTAKEN - WE IDENTIFIED A TOTAL HYDRO POTENTIAL OF 4367 MW OF GENERATION CAPACITY. IF TOTALLY DEVELOPED THESE SITES COULD PROVIDE OVER 9000 GIGAWATT HOURS OF ELECTRICAL ENERGY ANNUALLY - APPROXIMATELY 9% OF THE STATES TOTAL 1979 ELECTRIC GENERATION. COMPARING THIS 9% POTENTIAL WITH THE 1.6% ACTUAL HYDRO SHARE POINTS UP THE OPPORTUNITY THAT THIS RENEWABLE ENERGY RESOURCE REPRESENTS.

FURTHER, 1486 MW OF PENNSYLVANIA'S HYDRO POTENTIAL CAN BE DEVELOPED IN THE NEAR TERM AT 71 SITES WITH EXISTING DAMS. MOST OF THESE WOULD BE RELATIVELY SMALL PROJECTS, UNDERTAKEN BY PRIVATE DEVELOPERS OR MUNICIPALITIES. IN FACT, SIGNIFICANT INTEREST HAS ALREADY BEEN EXPRESSED BY THESE GROUPS: AS OF APRIL 1982 THE FEDERAL ENERGY REGULATORY COMMISSION HAD ALREADY

RECEIVED 166 APPLICATIONS TO DEVELOP 72 SEPARATE HYDRO SITES IN PENNSYLVANIA. CONSTRUCTION IS SLATED TO BEGIN ON THREE PROJECTS THIS YEAR, INCLUDING ONE TO BE JOINTLY DEVELOPED BY A MUNICIPAL GOVERNMENT AND A PRIVATE DEVELOPER.

THIS DEVELOPMENT, WHILE PROMISING, HAS THUS FAR PROCEEDED SLOWLY. THERE ARE STILL BOTH ECONOMIC AND INSTITUTIONAL BARRIERS THAT MUST BE ADDRESSED BEFORE THE FULL POTENTIAL OF THIS VALUABLE ENERGY SOURCE CAN BE REALIZED.

HYDROELECTRIC PROJECTS ARE EXPENSIVE AND CAPITAL INTENSIVE. THE INVESTMENT COSTS OF HYDRO PROJECTS, PER KILOWATT OF CAPACITY, VARY GREATLY ACCORDING TO THE SIZE, TYPE, HEAD, LOCATION OF PROJECT, THE AMOUNT AND COST OF LAND, AND THE COST OF RELOCATING FACILITIES WITHIN OR ADJACENT TO RESERVOIR AREAS, SUCH AS ROADS, BRDIGES, RAILROADS, AND COMMUNITIES. THE INITIAL INVESTMENT AT EXISTING SMALL-SCALE HYDROPOWER SITES THEREFORE RANGES TYPICALLY FROM $500/INSTALLED KW TO $1700/KW. NEW HYDRO FACILITIES CAN COST OVER $2000 PER KILOWATT INSTALLED.

IN ADDITION, HYDRO PROJECTS ARE CAPITAL INTENSIVE EVEN THOUGH THEY REQUIRE NO FUEL AND LITTLE MAINTENANCE OR OPERATING EXPENSE. AN ESTIMATED 82 TO 93 PERCENT OF THE ANNUAL COSTS OF HYDROELECTRIC POWER ARE THE COSTS OF INTEREST, TAXES, AND DEBT PAYMENT. THESE MAY BE COMPARED TO:

- 68 TO 78 PERCENT FOR NUCLEAR FACILITIES
- 48 TO 66 PERCENT FOR COAL-FIRED PLANTS.

CAPITAL INTENSIVENESS CAN BE A PARTICULAR PROBLEM IN HYDRO DEVELOPMENT WHERE PRIVATE FIRMS - RATHER THAN UTILITY

COMPANIES WITH GREATER ACCESS TO LOWER COST CAPITAL - ARE FACED WITH HIGH INTEREST RATES.

RECOGNIZING THIS PROBLEM, WE IN PENNSYLVANIA HAVE PROPOSED AS PART OF THE COMMONWEALTH'S FIRST COMPREHENSIVE ENERGY POLICY THE CREATION OF THE PENNSYLVANIA ENERGY DEVELOPMENT AUTHORITY. THIS AGENCY WOULD USE THE REVENUES FROM THE SALES OF TAX EXEMPT BONDS TO FINANCE, AT LOWER INTEREST RATES, THE DEVELOPMENT OF HYDRO AND OTHER RENEWABLE ENERGY PROJECTS. BELIEVING AS WE DO IN THE FUTURE OF HYDROPOWER FOR PENNSYLVANIA AND THE U.S. WE LOOK FORWARD TO THE PASSAGE OF THE LEGISLATION AUTHORIZING PEDA.

ALTHOUGH ACCESS TO CAPITAL AT REASONABLE COSTS IS CERTAINLY THE SINGLE MOST IMPORTANT ISSUE TO BE ADDRESSED IN ENABLING TIMELY DEVELOPMENT OF OUR HYDRO RESOURCES, OTHER CONCERNS DO EXIST. AMONG THEM IS THE FACT THAT LICENSING OF PROJECTS AT THE STATE AND FEDERAL LEVEL IS EXTREMELY COMPLEX. THE PROCEDURE HAS EVOLVED INTO A HIGHLY COMPLEX DECISION-MAKING PROCESS WITH A LARGE NUMBER OF PARTICIPANTS. MANY LAWS HAVE BEEN ENACTED AND REGULATIONS DRAFTED TO ASSURE THAT THE DEVELOPMENT OF A HYDRO PROJECT IS EVALUATED FROM A MULT-USE STANDPOINT -- RECREATION, WATER QUALITY, IRRIGATION, FISH AND WILDLIFE ENHANCEMENT, AND OVERAL ENVIRONMENTAL EFFECTS. WE IN PENNSYLVANIA ARE CURRENTLY STREAMLINING THE MANY STATE LAWS AND REGULATIONS WHICH REGULATE HYDRO DEVELOPMENT. SOME OF THE MORE IMPORTANT INCLUDE THE FOLLOWING:

1) THE DAM SAFETY ACT WHICH REGULATES WATER OBSTRUCTIONS ENCROACHMENTS.
2) FLOOD PLAIN MANAGEMENT REGULATIONS
3) WATER QUALITY STANDARDS AND PERMITS OR CERTIFICATIONS UNDER THE FEDERAL CLEAN WATER ACT AND STATE CLEAN STREAMS LAWS
4) FISHWAY PASSAGE REQUIREMENTS OF THE PENNSYLVANIA FISH COMMISSION
5) RIVER BASIN COMMISSION RULES AFFECTING PROJECTS HAVING SUBSTANTIAL IMPACT ON WATER OF THE DELAWARE AND SUSQUEHANNA RIVER BASINS.

FURTHER, A SERIES OF RECOMMENDATIONS HAVE BEEN MADE IN THE PENNSYLVANIA ENERGY POLICY THAT, IF IMPLEMENTED, WOULD ENCOURAGE GREATER USE OF HYDROELECTRIC POWER. CURRENTLY, OUR DEPARTMENT OF ENVIRONMENTAL RESOURCES LACKS THE AUTHORITY TO LEASE POTENTIAL STATE SITES FOR HYDRO DEVELOPMENT. IN ORDER TO DO SO, THE DEPARTMENT IS REQUIRED TO SEEK SPECIAL LEGISLATIVE AUTHORITY BEFORE ENTERING INTO ANY DEVELOPMENT CONTRACT. THIS REQUIREMENT HAS SLOWED THE GROWTH OF PENNSYLVANIA'S HYDRO CAPACITY.

ONE RECOMMENDATION WOULD ALLOW THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES 1) TO DEVELOP THE HYDROELECTRIC POTENTIAL AT THE 88 DAMS OWNED BY THE STATE, AND 2) TO CONTRACT WITH THE PRIVATE PARTIES TO DEVELOP THE STATE HYDRO CAPABILITY.

ANOTHER LEGISLATIVE PROPOSAL, WOULD PROVIDE FAVORABLE TAX TREATMENT TO SMALL-SCALE HYDRO FACILITIES.

IN SUMMARY, WE HAVE PROPOSED MANY INCENTIVES. MUCH REMAINS TO BE DONE AT BOTH THE STATE AND FEDERAL LEVEL IF HYDRO IS TO FULFILL ITS TREMENDOUS PROMISE.

I CONGRATULATE SENATOR SPECTER FOR RECOGNIZING THE POTENTIAL IN THE NORTHEAST FOR HYDROPOWER AND THANK THE SUBCOMMITTEE FOR ALLOWING ME TO GIVE PENNSYLVANIA'S PERSPECTIVE.

Senator MURKOWSKI. Thank you for that excellent testimony, Lieutenant Governor Scranton. I will make a few observations that I think are appropriate at this time.

I believe, Senator Specter, you stated earlier in your testimony that there was virtually no hydro development in the northeastern area, nor had there been any for some time, and I understand the last major project may have been in the State of Maine that was of any consequence.

There has been an effort to develop interest in lowhead hydro throughout our Nation, private development or what have you, but the realities seem to be associated with some of the environmental concerns, of course, which have a great deal of justification. By the same token, as Lieutenant Governor Scranton has pointed out, we have a situation now where the complexity of the licensing process has become so staggering that in order to develop any small hydro project from the standpoint of the private sector, it is almost economically infeasible from the standpoint of cost. Only the large developers can take on costs associated with the licensing process.

Senator Humphrey and I have held hearings with FERC to try and streamline the licensing process, simplify it, yet still maintain the environmental and ecological safeguards that have to be in it.

To complicate this matter even more, we have had a recent ruling from the Federal court that has designated that dams are a point source of pollution. Well, the course to the Federal Government of going back and clarifying that from the standpoint of making changes to respond to the fact that EPA must now come in and respond to that type of ruling just compounds the problem.

I have introduced a bill, and there is discussion on it in the Environment and Public Works Committee this morning, to clarify the intended language in the authorization that would preclude such a ruling for dams being considered a point source of pollution. Obviously we have more important environmental problems in this country than going back and suggesting whatever muddying of the water might be occurring from a dam that is already built should be taken out, and I go into this rather extensive harangue to emphasize again for the record the very real complexities that are associated with the power development.

It is really unfortunate that we cannot encourage our environmental community to recognize the necessity that hydropower is probably, without a doubt, the least environmentally desecrating from the standpoint of our land and the concerns associated with the alternative forms of energy, but the realities are today you have proposed an excellent brochure. I have had an opportunity to go through it briefly—inventorying the potential sites within your area. We come down to the question of how to fund them, and I am in the process now of drafting legislation, and Senator Specter, I appreciate your consideration and input in this development, which would authorize the Secretary of the Interior to contract out with non-Federal entities for the development of additional hydro resources at existing Bureau of Reclamation projects, and which would also establish a fund to finance from Federal power revenues, to finance Federal construction of additional hydropower plants; also at new and existing Bureau projects.

I think this would give an opportunity for input from the administration and public to focus on the issue involved and many of the issues that are brought up in this hearing this morning.

As you may or may not be aware, we do have an overlap within the committee. The TVA is in Public Works. Reclamation is this committee. The Corps of Engineers is Public Works. The Power Marketing Administration is in this committee, so that compounds the problem even more.

As far as the specific questions, I wonder if either of you would care to comment on how we overcome the extensive environmental concern that arises each time any effort is made to develop any hydro project? I am sure in your populated part of the Northeast and your State particularly we can expect this.

Does your State have the facilities within your department of environmental planning to make a strong statement in support of this type of development that will answer the fears of the environmental community?

Lieutenant Governor **Scranton**. Mr. Chairman, I believe so. One of the advantages we have in Pennsylvania, and I suspect it is also true in many of the other States in the Northeast-Midwest area, is that we have a great number of existing dam sites which would not require the building of new dams which are already environmentally in compliance which would require merely the retrofitting procedure, retrofitted with lowhead hydroelectric equipment, fish ladders in certain instances, et cetera, but are eminently doable at a relatively cheap cost.

On top of that is the fact that many of those dams are currently owned by the department of environmental resources which is eager to develop them, of course, in an environmentally benign way.

The Governor's energy council has undertaken a long series of discussions with DER in Pennsylvania, and we obviously must remain sensitive to the issue of environment in the State, but given the potential that exists at current dam sites and some of which are State owned, we don't believe that is an overwhelming problem.

Senator **Specter**. Mr. Chairman, beyond what Lieutenant Governor Scranton has testified to about existing dams being available, this is an issue which is going to have to be thrashed out with the environmental community, and essentially there are going to have to be choices, and the environmentalists are going to much prefer hydropower than the development of coal with the acid rain, the problems which were attendant there, and the problems of pollution which result from oil.

We really are going to need a mix. In the last statement I do not mean to suggest for a minute that we are abandoning the effort which many of us are undertaking to promote coal, environmentally appropriate coal, because I think we can do that, and certainly Pennsylvania has an enormous resource in that particular line—7 billion tons of anthracite and 30 billion tons of bituminous, but given the choice, I think the environmentalists will want a large portion of hydropower in the mix when we come down to that line.

Senator MURKOWSKI. I would certainly hope so, Senator. As we all know, the advantage of hydro is it is a renewable resource, and our others are not, with the exception of a few that have yet to be developed to their full capability, whether it be wind power or what have you.

I would like to point out, though, to emphasize the point that I brought up, that this committee has considered legislation previously, Senate bill 306, which was to install additional capacity at dams. The environmental community opposed that bill. Lieutenant Governor Scranton, you have that potential, but unfortunately, some of the environmental community does not recognize the necessity of, the realities associated with energy.

This Nation must have energy, and the question is what kind is most compatible with our environment? And logic certainly dictates to me that first we should develop our hydro potential to the maximum with concern obviously, real concern for the environment and the ecology, but we haven't done that in this Nation. I think it is extremely unfortunate and certainly contrary I think to the best interests of all citizens of this Nation because why should we be using up our resources when we have a potential renewable resource such as hydro that remains undeveloped in this highly developed Nation of ours?

Senator Specter, Lieutenant Governor Scranton, I want to thank you for your testimony. I will certainly be looking forward to working with you as your bill proceeds through the process, and Senator Specter, I would certainly appreciate your consideration as we attempt to develop some financing modes for opportunities to develop hydro to a further degree throughout the Nation.

Thank you, gentlemen.

Senator SPECTER. I certainly shall consider your suggestion, Mr. Chairman, and I again express my appreciation for the hearing and look forward to working with you on this and other matters.

Senator MURKOWSKI. Our next witness will be Mr. Edward J. Hanrahan, Deputy Director of the Office of Planning and Analysis, Department of Energy.

It's nice to see another Irishman this morning. I welcome you to the committee and ask that you proceed with your testimony.

STATEMENT OF EDWARD J. HANRAHAN, DEPUTY DIRECTOR, OFFICE OF POLICY, PLANNING AND ANALYSIS, DEPARTMENT OF ENERGY

Mr. HANRAHAN. Thank you, Mr. Chairman. We appreciate the opportunity to address the committee regarding S. 1918, a bill to establish a Northeast-Midwest States Federal Hydropower Financing Authority.

Although we strongly support the objective of developing all cost-effective and environmentally sound hydroelectric power potential throughout the United States, the Department of Energy opposes enactment of this proposal.

The introduction of the bill suggests that there are inadequate incentives for the development of cost-effective hydroelectric facilities. We believe that adequate incentives for the development of cost-effective hydroelectric facilities exist without a program of Federal loans or loan guarantees.

Additionally, there is no need to expend resources for study if no problem is demonstrated.

Historically private and public utilities, as well as the Federal Government, have developed hydroelectric sites in all parts of the country, and these entities are continuing today to develop these facilities, even though most of the best hydroelectric sites have already been developed. Between 1981 and 1990, 6,242 megawatts of hydroelectric facilities are scheduled to be developed or are under development in the United States. This is the capacity equivalent of six new large thermal plants. The reason for continued hydroelectric development is the increasing cost of electricity from other sources, notably oil and natural gas.

Not only are utilities and the Federal Government developing hydro sites, but since 1978 another major incentive has been promoting hydro and selected other sources of power. The Public Utility Regulatory Policies Act [PURPA] requires that utilities offer to purchase power from "qualifying facilities," which may be no larger than 80 megawatts, and pay them up to the full amount of costs that were avoided by making the purchase. These costs could include the costs of fuel not burned, maintenance not performed, and construction of generation, transmission, and distribution facilities not undertaken.

Needless to say, these incentives can be great. Over 3,400 applications have been made to the Federal Energy Regulatory Commission [FERC] in the last 4 years to develop new hydro facilities; 2,800 of these were made in 1981 and 1982 as the effects of higher oil and natural gas prices took effect.

I might also note that other qualifying facilities besides hydro dams are those which produce electricity either from some form of renewable resource including garbage or which cogenerate, including cogenerators using oil and natural gas. Such an electrical generating facility, including hydro sites, cannot remain as qualifying under PURPA if an electric utility owns more than 50 percent of it.

Title IV of PURPA contains authorities for grants and loans for the construction of electrical generating facilities in existing hydro dams. Congress deleted all funds for these programs in fiscal year

1982, recognizing that adequate incentives existed for development of hydroelectric resources in the absence of these funds.

In addition to non-Federal development, there are alternative means under consideration by which Federal projects might be funded and constructed. One method would be extension of the principle of allowing Federal agencies to accept funds from non-Federal entities for the addition of hydroelectric facilities at existing Federal dams. Discussions are also underway to develop means by which private capital can be made available for construction of hydropower facilities at Federal dams and can be repaid over a reasonable period of years with operation remaining with the Federal Government. Any of these alternatives would be consistent with the President's program and would be preferable to the creation of a new Federal agency funded by the U.S. Treasury.

Finally, S. 1918 proposes the establishment of a new independent Federal corporation, and the administration does not support the creation of additional Federal agencies. As an aside, I would like to point out that the provision in the bill establishing a board of directors consisting primarily of State members with responsibility for Federal funds, may pose a problem with respect to the appointment clause of the Constitution.

Mr. Chairman, this concludes my testimony. I will be happy to respond to any questions.

Senator MURKOWSKI. Thank you. I appreciate your testimony, Mr. Hanrahan. You indicated that there continues to be progress in the development of hydro in our Nation today, and I certainly concur.

How about in the northeast area?

Mr. HANRAHAN. In the Northeast?

Senator MURKOWSKI. Any significant?

Mr. HANRAHAN. Of the slightly more than 6,000 megawatts of scheduled or planned hydropower in the Nation, 740 megawatts of that is in the 18-State region. Of the 3,400 applications made in the last 4 years that are now before FERC, about a third of those are from this region.

Senator MURKOWSKI. Aren't those applications, many of them, very frankly speculative applications?

Mr. HANRAHAN. Yes.

Senator MURKOWSKI. Where people have gone in and filed in the hopes that they can sell their position and develop it?

Mr. HANRAHAN. There is speculation as well as double filing.

Senator MURKOWSKI. In your opinion, at the present time are there any positive projects that are going to be a reality in these areas? The economics dictate that either private funding can come in or there is an assured market to amortize the cost by contractual relationship with a utility.

Is there any brick and mortar money to do anything?

Mr. HANRAHAN. Of the projects that are in planning, yes.

Senator MURKOWSKI. I am talking about the northeast area.

Mr. HANRAHAN. In the northeast area? I would have to supply that answer for the record, sir. I don't know in detail personally.

[The information follows:]

The attached table gives figures, in KW, for licenses and exemptions from licenses issued by FERC for each of the years 1979-1982. The figures are broken down by state within the 18 state Northeast-Midwest region. A total capacity figure indicating the total annual KW for licenses or exemptions that were granted nationwide is also presented for comparison.

Receiving a license, or an exemption from a license, is the last major procedural step an applicant takes, in most cases, under the Federal Power Act before construction of hydroelectric facilities begins. Therefore, virtually all facilities receiving licenses or exemptions from licenses are actually constructed.

The data highlights two interesting facts.

First, the total amount of capacity nationwide receiving licenses or exemptions from licenses has risen from 236 MW in 1979 and 140 MW in 1980 to 313 MW in 1981 and 1,705 MW in 1982. Secondly, this trend is seen in the 18 state region as capacity receiving licenses or exemptions rose from 15 MW in 1979 and 20 MW in 1980 to 66 MW in 1981 and 149 MW in 1982. This trend occurred with, a short lag, at the time when world oil prices were accelerating from $13-$15/bbl to $35-$40/bbl. The data trends illustrate the economics of hydroelectricity improved significantly relative to the cost of electricity from other sources, especially oil, during this period.

Many of the projects listed in the table have been completed or are now under construction in the 18-state area. As an example, listed below are a sample of some of the larger facilities and the status of construction.

Name	Size(MW)	Percent Complete	State	Owner
Racine	40	90%	Ohio	American Elec. Power
Mechanicsville	17	21%	N.Y.	NY State Elec. and Gas
Lawrence	15	complete	Mass.	Lawrence Hydroelectric Associates & Essex Co.

Mr. Chairman, one final thought. While you are correct to point out that many preliminary permit applications are speculative in nature, FERC staff has advised us that about one-quarter of preliminary permit applications, in fact, eventually become actual dams. Therefore, even with the amount of speculation that occurs, we can expect that over 800 hydroelectric facilities will eventually be constructed from the roughly 3,400 preliminary permit applications of the last four years.

Attachment

ATTACHMENT

SUMMARY OF COMPLETION OF LICENSES AND EXEMPTIONS

Fiscal Year 1979 (Licenses)

State	Capacity
Maine	14,100
Vermont	1,200

Total capacity: 235,784

Fiscal Year 1980 (Licenses)

Maine	1,110
New York	11,000
Wisconsin	650

Fiscal Year 1980 (Exemptions)

New York	7,750

Total capacity: 139,904

Fiscal Year 1981 (Licenses)

Massachusetts	300
Michigan	700
New Hampshire	6,152
New Jersey	7,500
New York	19,201
Rhode Island	4,449
Vermont	2,000

Fiscal Year 1981 (Exemptions)

Connecticut	3,000
Massachusetts	1,070
Maine	1,284
New Hampshire	4,050
New York	8,635
Ohio	5,000
Rhode Island	1,675
Vermont	930

Total capacity: 312,994

SCALE is in KW

Fiscal Year 1982 (Licenses)

Connecticut	2,498
Illinois	8,853
Massachusetts	63
Maine	975
Michigan	250
New Hampshire	12,362
New York	16,738
Pennsylvania	14,800
Vermont	14,288

Fiscal Year 1982 (Exemptions)

Connecticut	660
Massachusetts	4,128
Maryland	330
Maine	1,800
Michigan	6,288
Minnesota	500
New Hampshire	10,918
New York	33,681
Pennsylvania	6,616
Vermont	13,615

Total capacity: 1,705,062

Senator **Murkowski**. You don't know in detail, but you know where the rest of them are.

Mr. **Hanrahan**. In detail, sir?

Senator **Murkowski**. In some generality; you indicated that there are many.

Mr. **Hanrahan**. There are many being pursued. I would have to guess, sir, that some of those do have a reality about them, although I don't know personally, in specific details, project by project.

Senator **Murkowski**. I gather from your testimony that they are not prominent in your mind in the sense that talking about a bill that would affect a particular area of our Nation, a combination of States, you are not aware of anything of significance that is going on or about to go on in those areas.

We would appreciate for the record any clarification that you might be able to provide on any current potential development that might be underway or is likely to be underway.

As far as the potential for hydro development in this area, would you agree that there is an available potential?

Mr. **Hanrahan**. Yes, sir.

Senator **Murkowski**. It has a commercial and reasonable cost/benefit return?

Mr. **Hanrahan**. Yes, sir. I think the surveyors have not necessarily looked at the cost effectiveness, but there is certainly a good proportion of potential for hydro development that would fit that, particularly in the region of the country that burns so much oil for electricity. That really is a major incentive for hydro in this area.

Senator **Murkowski**. You state that the development of adequate incentives for the development of cost-effective hydroelectric facilities exists without a program for Federal loans or loan guarantees.

If they exist, why aren't they being built? Because we have seen the price of oil treble and the Mideast dependence, and you have got a renewable resource. If everything is there——

Mr. **Hanrahan**. One of the major reasons is the cost of borrowing money today is so high. Also the financial conditions of many electric utilities are such that they are unwilling to go into the market to dilute their equity to raise money and to build projects which would reduce the cost of electricity for their customers.

The way electricity is regulated in many States, the utility would make that investment and their stockholders would make no benefit from it while the consumers would.

Senator **Murkowski**. So you feel it is primarily a function of the price of money rather than the environmental problems associated perhaps with the licensing?

Mr. **Hanrahan**. All of our regulatory aspects have problems with them, but they certainly can be dealt with. Dams are being, or hydro projects are being proposed and moved through regulatory procedures.

Senator **Murkowski**. I noted a reference to or rather pointed to one which I only take issue with because it happens to be true to my collective colleagues, that Congress has deleted all the funds for these purposes in fiscal 1982.

I wonder what the administration's position on that was, or do you have any knowledge, recognizing that adequate incentives exist for development of hydroelectric resources in the absence of these funds?

Mr. **Hanrahan**. I don't know the position that we took.

Senator **Murkowski**. You don't know the administration's position. I think I do. I think they wanted them deleted, but that is probably neither here nor there.

Would the Department of Energy support this bill if there were specific changes made because I am sure the Department of Energy is in favor as a policy matter of more hydro?

Mr. **Hanrahan**. Yes, sir. The Department of Energy is in favor of more hydro.

Senator **Murkowski**. Would you be kind enough or inclined to submit for the record what type of criteria that you would, the Department would like to see initiated through amendments to this bill that would make it supportable by the Department of Energy.

Mr. **Hanrahan**. I think our objection is more fundamental in that we are opposed to creation of another Federal agency and the provision for subsidized loans, so to change that would be to change the substance of the bill.

Senator **Murkowski**. How many subsidized programs are within the Department of Energy?

Mr. **Hanrahan**. I suspect there are any number, sir.

Senator **Murkowski**. Do you think you have a better subsidized program in existence that would take care of the Northeast problem?

Mr. **Hanrahan**. That will take care of the Northeast problems?

Senator **Murkowski**. The problems we both understand, of course, is to develop some hydro and we assume reasonable cost benefit.

Mr. HANRAHAN. The problem is to have a successful economic program which brings interest rates down into more reasonable ranges and to create an improved financial environment.

Senator MURKOWSKI. Do you think these projects are going to be financed in the open market? They never have been even when interest rates were 4, 5, 6 percent.

Mr. HANRAHAN. Many private utilities have built, have hydro facilities in the Northeast, and have financed them themselves.

Senator MURKOWSKI. That is true.

Mr. HANRAHAN. Through their own financing; there are already investment tax credits for the specific hydro facilities.

Senator MURKOWSKI. Is your objection based more on public versus private?

Mr. HANRAHAN. No; we have no objection as to who builds the facility. We would hope that hydro facilities are built. The public bodies already have incentives and the ability to float tax-free bonds.

Senator MURKOWSKI. I wonder if we will ever see the reduction in interest rates to a point where the private sector can afford to come in on projects. I have another reason. I don't want to get into that now, but we look at the creation of money market funds and the movement of the money in this country from the traditional passbook savings where it was at 5¼ to 5½ percent. Now it has moved over to money market certificates at 13 and 14 percent.

Are we kidding ourselves to think we are ever going to have low interest rates in this country? I rather doubt it because what those money funds are buying are Government bonds and so forth.

I think you have handled my questions extremely well. I want to commend you. I hope that you would have an answer down there for some unsubsidized program, and you have given me probably the answer that I felt is appropriate from the Department of Energy and the Secretary of Energy which I admire very much, and I'm sorry to see him leaving.

Thank you for your testimony, and I understand you will be submitting a bit for the record.

Mr. HANRAHAN. Yes. Thank you very much, sir.

Senator MURKOWSKI. We are going to have a very, very short break for a few moments. I will declare the hearing recessed until about 10 after 11.

[Whereupon, a brief recess was taken.]

Senator MURKOWSKI. We will terminate the recess and call the hearing back to order.

I believe that we have witnesses at the table—Mr. William F. Matson, executive vice president and general manager of Allegheny Electric Cooperative.

Mr. MATSON. Mr. Chairman, good morning.

Senator MURKOWSKI. It is a pleasure to welcome you; Mr. Michael McDowell, executive director, Committee on Power for the Southwest, Edmond, Okla.; Mr. Alex Radin, executive director, American Public Power Association; Mr. Morgan Dubrow, senior staff engineer, National Rural Electric Cooperative Association; Mr. Richard Cairo, secretary, Susquehanna River Basin Commission, Harrisburg, Pa.

I assume you have determined the order of your presentations, and with that I will ask that you proceed. I do apologize for keeping you waiting. I was testifying at Senator Chafee's hearing on two things—point source of pollution which I am sure you are aware of, as it is associated with dams, and the Clean Water Act as it applies to wetlands, both subjects that I am sure that you are aware of and are concerned with.

Please proceed.

STATEMENT OF WILLIAM F. MATSON, PRESIDENT, GREAT LAKES ELECTRIC CONSUMERS ASSOCIATION, HARRISBURG, PA.

Mr. **Matson**. Thank you, Mr. Chairman. My name is William F. Matson. I am here today as president of the Great Lakes Electric Consumers Association. I have a very brief statement, and I will read it because I can read it quicker than I can summarize it.

I would like to interject at the outset in response to some of the questions, some of the statements made by the previous witness, Mr. Chairman, and I appreciated the fact that you very obviously understood some of those discrepancies.

Senator **Murkowski**. If you are going to read 11 pages we are going to have some problems.

Mr. **Matson**. I don't propose to read that.

Senator **Murkowski**. Fine.

Mr. **Matson**. The response from DOE seems to me needs to be recognized from what they said. Of course, the going business, it seems to me the President and the Secretary have both told us repeatedly that DOE is to be phased out and is going to be gone. PURPA is going, the tax credits. The loan and loan guarantee program authorized under title IV of PURPA will be terminated this year. The tax credit for small-scale hydro is scheduled to be phased out in 1985, and the advantageous provision requiring utilities to purchase hydropower at avoided costs is under court challenge, so it seems to me that the suggestions of DOE this morning are on pretty shaky ground, and especially also the response to your question about private development.

It occurs to me in the Northeast, Midwest area the last substantial hydro project that was in fact built by the private companies was probably in excess of 50 years ago. The most recent one that I can think of was built in the fifties. That is a long time ago, Mr. Chairman. You are absolutely right, that there is very little that I see that would lead me to believe that much of that is going to be done.

Mr. Chairman, we have a number of people representing a number of different agencies or groups and organizations here. We share a common point of view, and we would be pleased to discuss with you some of those. We all would appreciate your indulgence in putting our remarks in the record.

Senator **Murkowski**. Your remarks will be entered into the record.[1]

Mr. **Matson**. We represent a large organization of rural electric cooperatives and municipals who share I think the concerns that much of this Nation shares, and that is the orderly development of our natural resources.

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[1] See the appendix.

Everyone, of course, in this country understands the problems of oil importation, and as has been pointed out a time or two already this morning, there are thousands, millions of kilowatts of hydropower available. That power cannot be developed in our opinion, Mr. Chairman, under the existing economics that are in our country, and that is why we are here to seek to share hopefully with the wisdom that the committee has ways that it can be accomplished.

As you are well aware, a kilowatt of installed capacity of hydro costs at least as much as a kilowatt of nuclear power, and everybody talks about the high capital-intensive nature of installation of nuclear, but like nuclear power, hydro, or even better than nuclear, hydro has a low-cost operation. As you pointed out yourself, Mr. Chairman, the renewable resource has a zero fuel cost, and that is important, but yet the capital-intensive nature means that getting the facility in place just has to have some additional initiative and some help, and that is why we are here, to talk about the subject this morning of this bill, and the organization that we are here representing or the many organizations are sort of included under one umbrella.

GLECA, the Great Lakes Electric Consumers Association, we are working very closely with the Senate and the House on the Midwest-Northeast Coalition, and we represent the municipal electric organizations and the rural electic cooperatives in this 18-State area in their endeavor to try and accomplish something in hydro.

Mr. Chairman, my particular statement has a number of things in it. Some have been referred to before. I recognize the committee is interested in being as expeditious as possible here, but we would like to have some of these things considered.

One of the things that Senator Specter referred to this morning is that while the Corps of Engineers has done great and mighty work around this Nation for many years, 75 percent, since the founding of the U.S. Corps of Engineers, 75 percent of all of those dollars that they have built the projects they have built have been outside this area of the Northeast that we are talking about. We have no Federal power marketing agency in this area as do the rest of the areas—five of them around the United States—and we desperately need the committee's input into that, and hopefully through the vehicle of this bill something along that line could be accomplished.

[The prepared statement of Mr. Matson follows:]

PREPARED STATEMENT OF WILLIAM F. MATSON, PRESIDENT, GREAT LAKES ELECTRIC CONSUMERS ASSOCIATION

My name is William F. Matson. I am here today as President of the Great Lakes Electric Consumer Association (GLECA).

GLECA represents several million consumers who are served by more than 750 consumer-owned municipal and cooperative electric systems in the nine-state Great Lakes region. GLECA was formed in 1981 to foster the full development of the region's water power resources. We believe in the development of these resources by existing electric power suppliers, but we also believe there is a real and necessary role for the federal government to play in the development of these important, publicly-owned resources.

I should also mention that I serve as the Executive Vice President and General Manager of the Pennsylvania Rural Electric Association and of Allegheny Electric Cooperative, organizations that serve the 14 consumer-owned and -controlled rural electric distribution cooperatives of Pennsylvania and New Jersey. Together, these rural electric distribution cooperatives serve over 640,000 farmers and other rural consumers. Allegheny Electric Cooperative, the 14 distribution cooperatives' wholesale power supplier, is deeply committed to the development of the Commonwealth's water power resources and is currently engaged in studies that could culminate in the installation of hydroelectric generating facilities at several sites in Central and Western Pennsylvania. Together, these sites represent a total potential installed generating capacity of 106 megawatts.

We appreciate the opportunity to be here today, Mr. Chairman, and we commend you for calling up Senate Bill 1918 for hearing.

Although this hearing occurs late in the session, we believe it represents the beginning of a process that will lead to the determination of the proper role to be played by the federal government in the development of the hydroelectric potential of the Northeast and Midwest. We believe the development of the region's hydro potential will expand the "yardstick" concept that has for so long benefitted the consumers of other parts of the country. The development of other regions' hydro potential and the availability of power from federal hydroelectric generating facilities has created a yardstick by which the performance of operating utilities has been able to be measured.

We cannot find adequate words to express our appreciation to Senator Specter and his colleagues for introducing S.1918. Obviously, Senate Bill 1918 does not provide all of the solutions to all of the problems confronting the development of the water power resources of the Northeast and Midwest. It does, however, represent progress toward finding these solutions; progress at a time when few people are discussing the issue and when even fewer are doing anything about it.

Many people will disagree with certain provisions contained in S.1918. Some people will say it calls for too great a federal role in the development of the region's water power resources; others will say it calls for too small a federal role. It will be claimed that this is not the best time for the federal government to begin to promote the development of the region's hydro potential, and it will also be claimed that the time has passed for federal entry into the field. During a time of budget reductions; critics will declare that there is no federal money available to assist in the development of the water power resources of the Northeast and Midwest. Some people might even claim that limited hydro potential is available for development in the region; an insufficient potential to require the involvement of the federal government.

I must take issue with the naysayers on every count. To me, the naysayers are only delaying the inevitable. I cannot imagine a future for the Northeast and Midwest that does not include the full development of the region's water power resources. Whether it takes ten years, twenty years, or a hundred years, these resources will be developed. I say: Let's get on with it; let's begin to enjoy the benefits the development of these resources will bring as soon as possible.

Probably the best point to begin a discussion of the development of the water power resources of the Northeast and Midwest is to look at the quantity and quality of these resources.

According to U. S. Army Corps of Engineers' estimates, a total potential of 3,000 megawatts of generating capacity is available for development at 99 existing dams in nine Northeast/Midwest states. This figure does not include another 2,000 megawatts of generating capacity that would be available if three major, and now deferred, projects were constructed. They are the Dicky-Lincoln and Tocks Island projects in Maine and New Jersey and the installation of pumped-storage capacity at

Raystown Lake in Pennsylvania.

Almost all of the sites identified by the Corps of Engineers represent a potential of less than 100 megawatts of installed capacity and most represent a potential of less than 50 megawatts of installed capacity. Because the amount of power these sites can produce is so limited and because the cost of developing any hydroelectric generating facility is so great, developers are faced with higher construction cost per megawatt of installed capacity for hydro than they are with other forms of generation. They are also faced with the prospect of carrying these small-scale hydroelectric generating facilities for several years before their accumulated benefits exceed their accumulated costs.

Despite these hurdles, we believe the development of the water power resources of the Northeast and Midwest must proceed for several reasons:

First, over the long run, hydroelectric generating facilities will provide the consumers of the Northeast and Midwest, who already pay the highest electric rates in the nation, with lower cost electricity than they would otherwise receive.

Second, lower long-term electric rates will ease one of the major negative points companies see in doing business in the Northeast and Midwest, thereby encouraging them to stay in the region. We believe it is in our nation's best strategic interests to reverse the current decline of the industrial base of the Northeast and Midwest.

Third, development of hydroelectric generating facilities now will create jobs immediately and will help revitalize the basic industries of the Northeast and Midwest.

Fourth, increased use of electricity generated at hydroelectric facilities will decrease our dependence on expensive imported petroleum, thereby improving our nation's strategic position.

Fifth, assistance in the development of the water power resources of the Northeast and Midwest by the federal government will represent the restoration of regional equity. For too long, taxpayers in the Northeast and Midwest have assisted consumers of other parts of the country through the investment of our tax dollars in federal generating facilities in their regions of the nation. We do not begrudge this investment, but believe it is time for equity.

Sixth, the need to develop our water power resources - our cleanest, safest, and most dependable energy resource - has become increasingly urgent as the cloud remains over the future of nuclear power and as environmental questions are being raised about the burning of coal. We believe these problems will be resolved and believe the continued development of nuclear energy and coal-fired generating facilities will proceed in an orderly fashion, but we believe our nation has no choice but to move forward with the development of our water power resources.

Seventh, the development of hydroelectric generating facilities, especially at existing dams, will provide us with an excellent opportunity to focus on the need to revitalize the public works of the Northeast and Midwest. One can hardly pick up the daily newspaper without reading about our crumbling navigation system or our endangered water supply systems. The "multiple use" concept that has worked so well with the water projects of the west can and should be applied in the Northeast and Midwest.

Eighth, development of the region's hydroelectric potential will enable us to improve the reliability of our electric generation and transmission system. On paper, our region now possesses excess generating capacity. In fact, however, much of this "excess" generating capacity consists of high-cost, oil-fired generation. In addition, I believe we would all agree that the reliability and security of our electric generation and transmission system would be improved through the addition of small-scale, dispersed generating facilities. One final comment on the issue of excess capacity: while it is difficult to prove, I strongly believe our nation will face serious energy shortages if the economic recovery we all hope for comes about soon.

The ninth and probably best reason to move ahead now is that the development of our water power resources will become increasingly expensive each year we delay the beginning of this development.

The cost of developing hydroelectric generating facilities brings me back to Senate Bill 1918. Because hydroelectric development is so capital-intensive, the cost of capital is a major factor developers must consider when making the go/no-go decisions on specific projects. To a hydro developer, it is the cost, not the availability, of capital that is important.

Regardless of the form of ownership, utility financing is not what it used to be. Several administrative and legislative changes have been proposed for the system of tax-exempt financing that has long represented the backbone of municipal electric financing. Proposals by the current national administration to diminish, then eliminate the financing programs of the Rural Electrification Administration (REA) would greatly increase interest costs for rural electric generation and transmission cooperatives. In just a decade, the financing costs of rural electric cooperatives for power supply projects have risen from two to more than sixteen percent. Legislation approved by the U. S. Senate last week to eliminate the deferral of taxes on income received from dividend reinvestment plans threaten the ability of private power companies to raise capital. Another action by the Senate last week, to diminish the so-called "safe harbor" leasing provisions of the 1981 tax law, will adversely affect the private power companies and some rural electric generation and transmission cooperatives. The point is: financing costs for utilities have increased in recent years and will continue to increase under current proposals.

My personal experience as a hydro developer, through Allegheny Electric Cooperative, has shown me that an interest differential of five, or three, or even one percent can make the difference in the feasibility of a small-scale hydroelectric project. Hydro developers, especially those in the Northeast and Midwest, need a stable, dependable source of financing. S. 1918 provides such a source. I am convinced that there is a greater need for the enactment of S. 1918 today than there was even a year ago when it was introduced.

There are two other provisions of S. 1918 I would like to touch on:

First, the benefits of the bill are denied to the so-called "hydro entrepreneurs." We strongly support this exclusion. We believe hydro power should be developed so as to most directly benefit consumers. The introduction of a "middleman" whose only concern is to make as much money as he can from hydro development does not fit into this public purpose and, therefore, we do not believe these people should be supported from the public treasury.

Second, because of the way the agency created by this legislation is structured, S. 1918 encourages the states to share in the development of their water power resources. In Pennsylvania, for example, we have been extremely pleased by the progressive attitude Governor Dick Thornburgh and our state legislature have shown regarding hydro development. A hydro tax incentive bill has cleared one house of the legislature and three other pieces of legislation that will benefit hydro development are on the legislative calendar. There are many important things the states can do to promote the development of the water power resources within their borders, but we cannot lose sight of the fact that the massive cost of such development makes significant federal financial involvement necessary and inevitable.

We believe the financing provisions contained in S. 1918 are important and that they will help utilities be better able to develop the hydro potential of the Northeast and Midwest.

But, as this Committee considers the potential role to be played by the federal government in the development of the region's water power resources, we urge you not to be limited by the provisions of S. 1918. We believe the role played by the federal government in the development of the water power resources of other regions of the nation can and should be repeated in the Northeast and Midwest.

In other regions of the nation:

- the federal government has directly developed the largest and most economically-feasible hydroelectric generating sites;
- the federal government has established federal power marketing administrations to sell electricity generated at federally-owned hydro facilities. In these sales, the PMAs have given preference to municipal, cooperative, and other consumer and publicly-owned electric utilities.

  As we reflect on the current threats to the preference concept, we are reminded of the thoughts on this subject by that great Progressive President Theodore Roosevelt. He said: "It is especially

> important that the development of water power should be guarded with the utmost care both by the National Government and by the States in order to protect the people against the upgrowth of monopoly and to insure to them a fair share of the benefits which will follow the development of this great asset which belongs to the people and should be controlled by them."

Now, almost three-quarters of a century after Roosevelt spoke those words, we continue to believe that our nation's water power resources must be developed so as to most directly benefit the people; and the federal government has either arranged adequate wheeling provisions to get hydro power most economically from the generating site to the consumer, or, in many cases, has actually constructed transmission facilities for this purpose.

In conclusion, Mr. Chairman, the consumers whose electric distribution systems comprise the Great Lakes Electric Consumer Association strongly support the development of the water power resources of the Northeast and Midwest. We do so because we believe hydro power represents our cleanest, safest, most dependable, and, in the long run, least expensive source of electric generation. We believe there is great potential for hydro development in the Northeast and Midwest. We believe there are compelling social, economic, and strategic reasons why this potential should be developed as quickly as possible. And we believe there is a real and necessary role to be played by the federal government in the development of these resources.

Again, Mr. Chairman, let me express our deep appreciation for your calling up S. 1918 for hearing and for allowing us to be represented here today. We pledge our assistance and cooperation as this Committee begins to shape a federal response to the need for hydroelectric development in the Northeast and Midwest.

Mr. **Matson**. I would like to ask Mr. Alex Radin of our American Public Power Association to make a couple of comments along that line.

Mr. **Radin**. Thank you.

Senator **Murkowski**. You may proceed.

STATEMENT OF ALEX RADIN, EXECUTIVE DIRECTOR, AMERICAN PUBLIC POWER ASSOCIATION

Mr. **Radin**. My name is Alex Radin. I am executive director of the American Public Power Association, which is the national organization representing about 1,750 municipal and other local public power systems throughout the United States.

If my statement could be inserted in the record, I will summarize it very briefly.

Mr. Chairman, we appreciate very much your holding this hearing and also your interest in hydroelectric power development and your interest in resolving the problem about point sources of pollution. I think that is an extremely important problem, and we appreciate very much what you are doing to try to get that resolved in an expeditious manner.

Mr. Chairman, I don't have to preach the gospel of hydroelectric power to you. I know that you are well aware of the importance of it. I had the good fortune recently of being in your State and visiting with the Alaska Power Authority which is a member of our association, as is the city of Anchorage and other municipalities there, and I know of the great interest and the potential hydroelectric power in Alaska at the Susitna project particularly which I know is up for very active consideration at the present time.

I also want to take this occasion to compliment Senators Specter and Riegle for their interest in sponsoring the legislation that is before you in 1982.

Our particular interest, Mr. Chairman, is in the existing Corps of Engineers' projects in this region. There are about 99 Corps of Engineers' dams in the region which do not have any power capacity. Those dams could be developed so that they would have about 3,000 megawatts of capacity. It is our feeling that the bill that is being considered is a very useful mechanism, but we think that it could be improved if a procedure were developed for Federal development of the hydroelectric potential of those existing dams.

We don't believe that all of the hydroelectric potential in this region should be Federal by any means, and the legislation that is being considered will be most helpful for non-Federal development.

On the other hand, if we do not have a single developer of a potential in the hydroelectric sites that exist at the Corps of Engineer projects, we are likely to have piecemeal development, and the best projects will be developed first and some of those that are less economic will not be developed, whereas if you had a single entity that already owns all those dams develop these projects, then they could meld the better projects with those that are less favorable for development, and you can have more comprehensive and total development of the hydro resources of that area, and if you merged all those, melded them together, the power rate has been estimated to be about 26 mils which would still be a very favorable rate, whereas if you developed the best projects and left the ones that are not so favorable, the ones that would be not so favorable would be as high as 63 mils or more and might not be marketable at the present time.

While that would require Federal investment, that would be repaid in full to the Federal Treasury with interest and would provide a continuing benefit to the region and to the Nation, so we would like to suggest that the committee give consideration to providing Federal development for the existing Federal sites that are available in that area and which have not been developed to date. As I say, that money would be paid back in full to the Federal Treasury and would provide available resources and would be of benefit to the Nation.

As I say, that would not preclude by any means S. 1918 which we think is valuable, but I think for the existing dams some special consideration needs to be given to be sure that you have comprehensive development at those sites.

Thank you, sir.

[The prepared statement of Mr. Radin follows:]

STATEMENT OF
Alex Radin
Executive Director
AMERICAN PUBLIC POWER ASSOCIATION

Presented to
Senate Energy Committee, Subcommittee on Water & Power
on
S.1918
THE NORTHEAST-MIDWEST STATES FEDERAL HYDROPOWER FINANCING AUTHORITY ACT

July 29, 1982

Mr. Chairman, my name is Alex Radin. I am the Executive Director of the American Public Power Association. APPA is the national service organization representing more than 1,750 municipal and other local public power systems throughout the United States. I appreciate the opportunity to discuss with you my views on hydropower development in the Northeast and Midwest regions.

S. 1918, the Northeast-Midwest States Federal Hydropower Financing Authority Act, would establish a Corporation authorized to make loans and guarantees to certain identified entities to enable them to finance the construction of new hydroelectric facilities.

Although APPA has not taken a formal position on this measure, the Association has long favored the earliest possible maximum comprehensive development of the nation's water resources for the production of hydroelectric power and other purposes. Hydroelectric power is a non-polluting, renewable energy resource that frequently provides energy at a lower cost than alternative sources. Furthermore, hydroelectric power is a "paying partner" which often enhances the feasibility of other important aspects of multi-purpose water resource development, such as navigation, flood control and recreation.

I regard S. 1918 as an important step forward in achieving the development of the Northeast and Midwest regions' long-neglected hydroelectric power resources. I want to compliment Senators Arlen Specter and Don Riegle for recognizing the value of these resources, and for exercising leadership in encouraging their development. They also have undoubtedly been instrumental in encouraging the Northeast-Midwest Congressional Coalition to endorse refurbishment of Federally-owned dams by the Army Corps of Engineers, with the power marketed to rural electric cooperatives and municipal power systems. (This endorsement is contained in the recently published booklet, Building a Water Policy Consensus: Issues for the Eighties.)

Although S. 1918 is an appropriate part of a regional program to develop new hydroelectric power projects, it falls short, in my opinion, of providing the most desirable mechanism for achieving the goal of maximum comprehensive development of the region's water resources. The reason is that S. 1918 does not provide for a plan for comprehensive development, but instead relies on assistance on a case-by-case or site-by-site basis. In addition to S. 1918, therefore, I believe a comprehensive Federal development program is essential to capture the full benefits of the region's hydro resources, particularly with respect to the upgrading of existing Federal dams throughout the region.

Over the past few years, APPA has supported a number of hydro development measures. For example, we supported Title IV of the Public Utility Regulatory Policies Act, which contained a small scale hydro loan program to promote development of small hydro projects at existing dams. The loan and loan guarantee programs of S. 1918 are similar in intent to that program.

Like Title IV of PURPA, S. 1918 is designed to encourage the development of individual sites. This is desirable, but additional advantages could be obtained by comprehensive development of the region's hydroelectric power facilities, especially of existing Federal dams in the Northeast and Midwest. These dams, of which there are a number in the region, are owned by a single entity, the United States Government, and there is good reason to treat the hydroelectric power potential at these sites as a single resource rather than as a series of isolated projects.

If used to develop the hydropower potential at existing U.S. Corps of Engineers' dams, loan and loan guarantees issued under the bill could result in underdevelopment of the feasible hydro potential at these sites. For this reason, I would strongly encourage the Committee to explore additional alternatives, including the Federal development and marketing of power from the Federal dams in which power facilities have not been installed.

The combined hydroelectric potential of existing Federal dams is considerable. Initial Corps of Engineers' estimates suggested a maximum capacity of 6000 mw at existing Federal dams located in Ohio, Illinois, Indiana, Michigan, Minnesota, Wisconsin, Iowa, West Virginia and western Pennsylvania. Obviously, not every project could be developed economically. However, a sufficient number could be built to produce a substantial amount of power for distribution within the region. The Corps' initial estimates have been refined and it now appears that there are approximately 99 sites where development is feasible. From these 99 sites it would be possible to develop nearly 3000 mw of capacity.

This 3000 mw, the equivalent of three new nuclear power plants, represents approximately 20 percent of the present load of the nearly 660 municipal and rural electric cooperative systems located throughout the region. It could potentially satisfy the region's municipal and rural electric cooperative load growth requirements throughout the next decade.

As a practical matter, piecemeal development is unlikely to capture the full benefits of this resource, because the best sites would be developed first while the marginal sites would probably not be developed at the present time and might not be developed at all. Incomplete development of all potentially economic sites could therefore result if the region relies only on S. 1918.

Under the bill, loans are to be made only when the Corporation determines that there is a "reasonable prospect of repayment," and more significantly, that the project "will have a substantial value in helping to meet the energy needs of the Northeast and Midwest States." Marginal projects, which would be economic under a comprehensive development program, would probably not qualify for loans since they would be less likely to meet the "substantial value" test. In addition, developers of such projects may not be able to convince the Corporation that there is a "reasonable prospect of repayment."

In contrast, comprehensive development under a Federal program would be more likely to capture the full hydropower benefits of these dams, and do so while providing power at a reasonable cost. This is true because under a region-wide plan projects with the highest benefit-to-cost ratios could make feasible those projects with marginal benefit-to-cost ratios. The Department of Energy has estimated that the average energy costs at the Corps dams throughout the region would range between 11 and 63 mills per kwh. However, if all feasible projects were developed as part of a regional system, the average price would be approximately 26 mills per kwh. Thus, comprehensive development would improve the prospects of developing all feasible projects and the total cost on a system-wide basis would be very attractive.

Comprehensive development, of course, could not proceed without a marketing program to blend together the best and the less economically desirable projects, with the power from such projects to be marketed at a melded rate. A cohesive marketing scheme could yield additional benefits, such as the ability to take advantage of regional diversity in load requirements. A regional marketing program also would permit the dams to be operated in a manner which would maximize their total capacity. This, of course, would require either access to transmission capacity or the construction of new transmission facilities, or both.

If a comprehensive development program undertaken by the Federal government were pursued, we would expect that that the power would be marketed under traditional Federal power marketing policies, granting preference to local public power and rural electric cooperative systems. Not only is the flowing water a public resource, but the Corps dams are also public property. If the power potential from these dams is to be developed in a comprehensive manner, then this power should be marketed in a manner which provides the greatest benefit to the public. The non-profit consumer owned systems within the region would ensure that the benefits from these public resources would flow directly to the public, without passing through a toll gate erected by private interests.

Federal development such as I have outlined would be consistent with long-standing programs which have provided benefits to other sections of the Nation for most of this century. In fact, the Northeast-Midwest region is the only region in the country which has not benefitted from such a development. It is well past time when this important area should receive the benefits of programs which have proven their value elsewhere.

In view of the present fiscal problems facing the Federal government, I recognize the difficulty of obtaining approval at this time of Federal appropriations for water resources development. However, there is little difference in terms of budgetary impact between a Federal expenditure recovered over a period of years through power revenues and a Federal loan repaid over an equal period of years. Furthermore, the Federal government would own the water resources projects after the appropriations were repaid, thus providing the government with a valuable revenue-producing asset.

In addition, where a Federal dam is involved, it seems to us to make sense to retain Federal control over the operation of that dam to ensure that it is operated in a manner consistent with a multiplicity of functions, from flood control to navigation to recreation to power production.

If the Congress will move ahead with a comprehensive program for the Federal development and marketing of power from Federal dams throughout the region, then other significant energy programs in the Northeast-Midwest might thereafter be pursued. New transmission systems between the Northeast-Midwest might be explored with the goal of capturing and utilizing excess generating capacity, and substituting hydroelectric or other sources of energy for electricity produced from oil or natural gas. Federal involvement in the region might also facilitate power exchange or power sales agreements between U. S. and Canada.

I have attempted to address what I regard as the optimal program for hydropower development in the Northeast-Midwest region. Obviously, Federal development activities at Federal dams would not preclude the enactment of S. 1918. In fact, the two programs could go hand in hand.

I am pleased that the Northeast-Midwest congressional coalition is examining appropriate means of developing the region's hydroelectric potential. We have worked with other regions in exploring similar problems and are therefore aware of the financial as well as political difficulties which must be confronted. Nevertheless, APPA is anxious to assist both the coalition and this subcommittee in overcoming these problems.

I am pleased to have had this opportunity to present our views. I would be happy to respond to any questions you might have.

Senator MURKOWSKI. Thank you very much, Mr. Radin. Do you have further testimony?

Mr. MATSON. Yes. We have a couple of other sentences. One of the things that I would like to say, too, is that while many people disagree with certain provisions contained in S. 1918, some people say it calls for too great a Federal role in the development of regional water power resources, and others say it calls for too small a Federal role. Also it has been claimed that this is not the best time for the Federal Government to begin to promote the development of regions' hydro projects, and it will also be claimed that the time is past for Federal entry into the field.

Well, there are many other claims that have been made, and I want to take issue with the nay-sayers on every one of these counts that are in our testimony. To me, the nay-sayers are only delaying the inevitable. I cannot imagine a future for the Northeast and Midwest that does not include the full development of regional water power resources.

Senator MURKOWSKI. I would like as a matter of observation, Mr. Matson, to indicate to you that it is my understanding that 75 percent of the Corps of Engineers' spending is outside, outside the Northeast area, outside your area.

Mr. MATSON. Yes, sir.

Senator MURKOWSKI. Now there are corps sites and you should be aware that those are in the Environment and Public Works Committee.

Mr. MATSON. Yes, sir.

Senator MURKOWSKI. And you should certainly be working for authorization through your contact with that committee. I have an opportunity to serve on that committee as well.

Mr. MATSON. Yes. We are hoping to touch base there, Mr. Chairman.

Morgan Dubrow is the senior staff engineer for the National Rural Electric Cooperative Association here in Washington, D.C., and has a long and distinguished history in the hydropower business, and we would like to call on him for a couple of remarks.

STATEMENT OF MORGAN D. DUBROW, SENIOR STAFF ENGINEER, NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

Mr. Dubrow. Thank you, Senator. I just want to say very quickly that I speak for the total association and the 25 million people concerned.

We endorse and support Mr. Matson's statement that he made for the record and what has been said here this morning by both him and Mr. Radin.

We are very pleased and grateful that Senator Specter and Senator Riegel and others introduced this bill. We have always stood for comprehensive development, and I personally believe that in the best of worlds we would like to see the Federal Government continue to develop these projects, but we recognize that it is going to be difficult, and I view this bill as an opportunity to provide some funds so that some of our public power people can accelerate, help build these projects.

This view is supported by our entire membership in two resolutions which I have quoted in my testimony. One of them addresses itself directly to GLECA and what it stands for and why we support it. The other one addresses the idea that our people can and will and are willing to participate in some kind of joint development along with the Government of some of these projects.

I simply would close by again thanking you for holding this hearing and for giving us an opportunity to be here and to testify so that through this means we hope that we can get on with the continued development of some hydro in these two regions which have, up to this point, haven't had any.

Thank you very much.

[The prepared statement of Mr. Dubrow follows:]

STATEMENT OF MORGAN D. DUBROW
NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION
Senate Bill 1918
Before
The Subcommittee on Water and Power
Committee on Energy and Natural Resources
July 29, 1982

Mr. Chairman and members of the Subcommittee, my name is Morgan D. Dubrow, Senior Staff Engineer of the National Rural Electric Cooperative Association (NRECA). We appreciate this opportunity to appear before this Subcommittee to express our views on S. 1918, a bill "To establish the Northeast-Midwest States Federal Hydropower Financing Authority".

NRECA is a national service organization representing more than 1,000 rural electric systems in 46 states. These systems, mostly all cooperatives, serve more than 25 million consumers in 2600 of the 3100 counties in the United States. Members of NRECA provide electricity to over 70 percent of the land area of this nation.

NRECA is pleased to appear with Mr. William F. Matson, President of the Great Lakes Electric Consumer Association, the General Manager of the Pennsylvania Rural Electric Association, and the Executive Vice-President of Allegheny Electric Co-op. Our association fully endorses Mr. Matson's statement and joins with him in expressing appreciation to Senator Arlen Specter and Senator Donald W. Riegle and colleagues for introducing S. 1918.

Our association has been a strong advocate for comprehensive resource water development almost since its inception. We have a Standing Committee on Power and Water Resources comprised of representatives from our 10 regions throughout the United States which meets annually to consider and recommend all policy matters directly involving water resources, power generation and regulatory policies relating to the rural electrification program. Upon the recommendation of this committee, at our 40th annual meeting in Atlanta, Georgia on February 10, our membership unanimously endorsed a resolution on "Cooperative Installation of Generating Facilities in Federal Water Impoundments" which reads as follows:

> "There are many federal water impoundments which are capable of having installed therein, or as a part thereof, hydroelectric generating facilities.
>
> "Unless the federal government timely acts to install such facilities and market the output thereof pursuant to the preference laws, NRECA urges its member systems to study the feasibility of installing such facilities, either solely by themselves or in cooperation with other entities and, where found feasible, to undertake to install such facilities and receive the electric production therefrom and to utilize the same as they find to be most desirable including, if such be the case, the marketing of such power and energy to or through Federal Power Marketing Agencies."

On the recommendation of the Power and Water Resources Committee, the entire membership also unanimously endorsed the following resolution entitled "Support for Creation of a Federal Great Lakes Power Marketing Agency":

> "The potential for consumer-owned utilities in the nine-state region of the northcentral United States, presently represented by the newly formed Great Lakes Electric Consumers Association (GLECA) to install generators in existing federal dams has tremendous benefit for the entire region. In order to coordinate a unified approach to the development and marketing of this important resource, NRECA believes it to be imperative that the Administration create a new Power Marketing Agency and we believe that the approximately 660 preference entities within the region would benefit significantly by the creation of such an agency.
>
> "A multiplicity of reasons exist for the creation of such a new federal entity including:
>
> Development of Valuable Energy Resources. Because of the cost of their development, many potential water power resources may not be developed unless the federal government provides financing.
>
> Coordination of Development. A Federal Power Marketing Agency would bring order to the development of the region's water power

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> resources. Without this coordination, many potential hydroelectric generating sites may never be developed and others may be left underdeveloped. A Federal Power Marketing Agency would view the development of these resources from a system-wide viewpoint, something individual developers cannot (or will not) do. By coordinating the development of the region's water power resources, a Federal Power Marketing Agency would be able to make more low-cost hydroelectric power available to consumers than otherwise might be the case.
>
> Condition of Regional Consumer-owned Utilities. The financial condition of most of the region's utilities limits their ability to invest in new capacity. A Federal Power Marketing Agency would provide the capital needed to develop the region's water power resources. In addition, the capital costs of this development would be less if done by the Federal Power Marketing Agency because of the federal government's access to lower-cost financing than that available to utilities. By decreasing the capital costs associated with water power projects, the cost of power to consumers would be reduced.
>
> Limitations on New Capacity. State regulatory agencies may limit utilities' abilities to develop new hydroelectric generating facilities because of existing 'excess capacity' even though much of the existing 'excess capacity' may be oil-fired. A Federal Power Marketing Agency is not limited by state regulatory agencies and would, therefore, be free to proceed with the development of the region's water power resources.
>
> Regional Equity. Over the years the nine-state region has not shared in the significant investment the federal government has made in hydroelectric and water projects in other parts of the nation. Federal involvement in the development of the region's water power resources would be consistent with federal practice in all other parts of the nation."

The critical need for energy in our nation today and in the near future necessitates the maximum use of the falling water of this country, a replenishing resource that requires no further research and development to harness. For example, the 23 existing navigation dams on the Upper Mississippi River have a potential for generating approximately 160 billion kilowatthours of electricity; this would save 727,000 barrels of oil per day according to an estimate in a recent study by the U.S. Army Corps of Engineers. Provision was made at the time of construction of these dams for later adding electrical generation. Our preference would be to have these power facilities built by the Federal Government and the power marketed by a power marketing agency under the preference provisions of the 1944 Flood Control Act. Recognizing, however, the serious problem of providing Federal funds for this purpose, we believe that this legislation could be utilized by our member systems to obtain funds to participate in the development of these Federal power resources.

Mr. Chairman, we wish to advise the Subcommittee once again that NRECA supports well planned water development projects as a means to reduce our dependence on imported petroleum products. We continue to believe that the prudent use of taxpayers' money in water development projects will be beneficial to all citizens. There are many Federal water impoundments which are capable of having installed hydroelectric generating facilities. We urge the Federal Government to act timely to install such facilities and market the output pursuant to the preference laws through Federal power marketing agencies. Meanwhile, a number of our member systems are studying the feasibility of installing hydro facilities at existing dams. They propose to obtain licenses from the Federal Energy Regulatory Commission to construct power plants at such dams, thereby making this economic renewable energy resource available to our member consumers.

In closing, we thank the Chairman for holding this hearing on S. 1918 and for allowing NRECA to be represented here today. We will continue to cooperate with this Subcommittee to develop a Federal program to meet the needs for hydroelectric development in the Northeast and Midwest regions of this nation.

Mr. **Matson**. Mr. Michael McDowell is the executive director for the Committee on Power for the Southwest, and he is here and we would like to have his observations included, please.

Senator **Murkowski**. Please proceed.

STATEMENT OF MICHAEL McDOWELL, EXECUTIVE DIRECTOR, COMMITTEE ON POWER FOR THE SOUTHWEST

Mr. **McDowell**. Mr. Chairman, I appreciate the opportunity to come before you.

We are an organization of rural electric cooperatives and municipally owned electric utilities located in Arkansas, Louisiana, Kansas, Missouri, Oklahoma, and Texas. Our members are preference customers of the Southwestern Power Administration, and we are here in support of the Great Lakes Electric Consumers Association, and subscribe fully to the comments of Mr. Matson and also Mr. Radin and Mr. Dubrow.

I might suggest to you that in our region particularly the Federal marketing and development program has substantially contributed to the economic development of our region. We are substantially a rural region. If it were not for the Federal power program, I would submit to you that there would still be substantial areas of our region without electricity.

The need for comprehensive hydroelectric development, I think, is overriding, and I think it is very appropriate and perhaps long overdue that the Northeast-Midwest region be considered. Senate 1918 provides a vehicle for discussing these issues, and we hope that a policy and program can come out of this that would contribute to the hydroelectric development in our region.

We support completely the idea of building upon the successful programs of the work in other parts of the country, including ourselves, in the development of hydroelectric resources, and expect to work both with APPA and NRECA as well as our sister organization, the Great Lakes Electric Consumers.

[The prepared statement of Mr. McDowell follows:]

Prepared Statement of Michael McDowell, Executive Director, Committee on Power for the Southwest

Mr. Chairman, members of the committee, it is a pleasure to appear before you to discuss S. 1918, which addresses the very important issue of hydroelectric development in the Northeast - Midwest region of our nation. My name is Mike McDowell and I am executive director of the Committee on Power for the Southwest. We are a nonprofit service organization of 175 rural electric cooperatives and 65 municipal electric systems located in the states of Arkansas, Kansas, Louisiana, Missouri, Oklahoma and Texas. Our members are preference customers of the Southwestern Power Administration, the power marketing agency of the Department of Energy which markets hydroelectric power from Federal dams located within these six states. The Committee on Power for the Southwest serves as a forum for the concerns and interests of the consumer-owned electric utilities in our region and works closely with the American Public Power Association, National Rural Electric Cooperative Association and other regional associations of consumer-owned electric utilities, including Great Lakes Electric Consumers Association. Our offices are located at 400 South Broadway, Suite 3, P.O. Box 1360, Edmond, Oklahoma 73083.

It is appropriate and long overdue that the hydroelectric resources of the Northeast-Midwest region be developed to the maximum extent possible. Installation of generators at existing Federal projects would be of substantial benefit for the entire nation as well as that region.

S. 1918 would, as we understand it, provide low-cost loans and loan guarantees for hydroelectric development in the region. States would have the option to join a regional financing authority. Public power systems, rural electric cooperatives, investor-owned electric companies and some other entities would be eligible to obtain loans and guarantees to cover up to 70 percent of a proposed project. Interest rates would be established by the financing authority. The Corps of Engineers would be authorized to complete studies of the hydro potential in each member state.

The Northeast-Midwest region is the only part of the nation in which the Federal government has not provided assistance on a regional basis in the development of hydroelectric power. S.1918 seeks to provide such assistance. The Northeast-Midwest region is estimated to contain one-half of the feasible hydro sites and 20 percent of the potential hydroelectric capacity in the United States. Hydroelectric power is a nonpolluting, renewable resource which could reduce the use of imported oil. Federal assistance for regional hydroelectric development is quite appropriate and has been a major contributor to those regions of the country where it has been operating.

The small towns and rural areas of the Southwest region became electrified due mainly to the Rural Electrification Administration and a Federal power development and marketing program. There are members of the Committee on Power for the Southwest who can recall the years before electricity was available to farms and small towns. I can assure you that those days are not recalled with great fondness by many in our region. Because of the inability and/or refusal by investor-owned electric companies to serve these areas, many rural electric cooperatives and public power systems of the six state region looked to Federal water and power development as the means of obtaining a reliable and affordable supply of electricity. The result was an agricultural production system which is the envy of the world and a substantial improvement of living conditions for rural citizens. Federal hydro power development helped sustain a diversified electric industry and thus contributed to lower rates for consumers in our region.

The policy of preference to consumer-owned systems in purchasing Federal power was established many years ago and was continued in the Flood Control Act of 1944, under which the Federal power program was developed and continues to operate in our region. This Federal power program requires that such power be sold at the lowest possible cost consistent with sound business principles in order to insure its most widespread use.

Federal power marketing policies have achieved their original goals in the Southwest region: competition has been fostered in the electric industry; small towns and rural areas have control over an essential service with assured access to Federal power; a national resource was made available to consumers at the lowest possible cost through the use of nonprofit consumer-owned electric utilities.

In order to coordinate a unified approach to the development and marketing of this important resource, we believe that the Northeast-Midwest hydroelectric potential could be most effectively developed by following the successful Federal power programs in the South and West. A new power marketing agency is needed to provide the leadership necessary to carry out comprehensive Federal hydro power development assistance in the region.

There are many reasons for such an approach:

Development of Valuable Energy Resources

Because of the cost of development, many potential water power resources may not be developed unless the Federal government provides financing.

Coordination of Development

A Federal power development and marketing program would bring order to the development of the region's water power resources. Without this coordination, many potential hydroelectric generating sites may never be developed and others may be left underdeveloped. A Federal power marketing agency would view the development of these resources from a system-wide view point, something neither individual developers nor individual states can, or will, do. By coordinating the development of the region's water power resources, a Federal power marketing agency would be able to make more low hydroelectric power available to consumers than otherwise might be the case.

Condition of Regional Consumer-Owned Utilities

The financial condition of many consumer-owned electric utilities limits their ability to invest in new capacity. A Federal power marketing program could provide key help in obtaining the capital needed to develop the region's water power resources. In addition, the capital costs of hydro projects would be less if done through a Federal power development and marketing program because of the Federal government's access to lower-cost financing than that available to other entities. By decreasing the capital costs associated with water power projects, the cost of power to consumers would be reduced.

Limitations on New Capacity

State regulatory agencies may limit utilities' abilities to develop new hydroelectric generating facilities because of existing "excess capacity," even though much of the existing "excess capacity" may be oilfired. A Federal power development and marketing program is not limited by state regulatory agencies and would, therefore, be free to proceed with the development of the region's water power resources.

Regional Equity

Over the years the Northeast-Midwest region has not shared in the significant investment the Federal government has made in water and power projects in other parts of the nation. Federal involvement in the development of the region's water power resources would be consistent with Federal policy in other parts of the nation.

It is our hope that a Federal role in the Northeast-Midwest region's hydro electric development can be built on the demonstrated success in other parts of the nation of the current longstanding Federal power development and marketing policies. Some 1000-2000 MW of potential hydroelectric capacity is estimated to be available in our region at existing Federal dams but remains undeveloped. We expect to work with the Southwestern Power Administration in developing new approaches to bring this power on line for the benefit of our region. The development of a comprehensive Federal power program in the Northeast-Midwest region designed to meet the needs of the 1980's would be of great benefit to the national effort to more fully develop hydroelectric power. You will find that consumer-owned electric utilities will, as they always have, participate in efforts to develop our national water power resources for the maximum benefit of the public.

Mr. Matson. Mr. Chairman, our final member of the panel is Dick Cairo, the secretary of the Susquehanna River Basin Commission from Harrisburg.

We are pleased to have him representing that organization, and, of course, we were delighted with Senator Specter and Lieutenant Governor Scranton being here, being supportive.

Of course, Senator Specter has done an awful lot of work on this, and we are delighted with the work that has been done.

Senator Murkowski. Thank you, Mr. Matson.

Mr. Cairo?

STATEMENT OF RICHARD A. CAIRO, SECRETARY, SUSQUEHANNA RIVER BASIN COMMISSION

Mr. Cairo. Thank you. My name is Richard Cairo, and I am the Secretary to the Susquehanna River Basin Commission. I wish to thank the subcommittee for extending this opportunity to testify on Senate bill 1918.

I have submitted written copies of my testimony to your staff. My statement is very brief. I propose to read it.

The Susquehanna River Basin Commission is a Federal-interstate compact commission whose signatory membership includes the United States, New York, Pennsylvania, and Maryland. This compact was enacted into law by the Congress and the legislatures of the three State signatories. It sets forth the responsibilities of the commission in the management of the water resources of the 27,500 square mile Susquehanna drainage basin.

Several provisions of the compact directly or indirectly address the commission's involvement in hydroelectric development. Article 10 empowers the commission to develop and operate hydroelectric facilities and attendant transmission facilities. Thus the commission is a potential developer of northeastern hydropower and stands to benefit from the proposed section 6(a) allowing the proposed hydropower authority to make loans to interstate compact river commissions.

Mr. Chairman, I might add, as an aside here, that under the compact our current interest limit on bonds is 6 percent and it would take an act of Congress and the three legislatures to change that, so it is particularly important to us that the loan money if we were to get into the——

Senator Murkowski. It would take an act of Congress to change your rate structure?

Mr. Cairo. Yes, Mr. Chairman, because to amend the compact it would take an act of Congress and an act of the three State legislatures to do that.

Senator Murkowski. If you want some money from that source you better use the one introduced because you are not going to get any money at 6 percent.

Mr. Cairo. I will proceed ahead here. Under article 14, section 14.1 of the compact, the commission adopted a "Comprehensive Plan for the Management and Development of the Water Resources of the Susquehanna River Basin." The plan, which was adopted in December 1973, and amended from time to time thereafter, sets forth goals and objectives in the areas of water quality, water supplies, fish and wildlife protection, flood plain management, and recreation.

Section 3.10 of the compact charges the commission with the review and approval of certain water resource projects, including hydroelectric projects, for conformance with the comprehensive plan.

Senator **Murkowski**. Excuse me. I am going to have to recess the hearing. There is a vote on, and it should take about 5 minutes.

I might suggest that you converse collectively. You are representatives of a number of States, and the question I was going to ask is do you have a priority list of potentials that you have agreed upon that are most likely in your opinion to have an adequate cost/benefit return? We will get into that later. I want to come back and have Mr. Cairo conclude his statement.

With that, we are going to adjourn or recess for 5 minutes.

[Whereupon, a brief recess was taken.]

Senator **Murkowski**. We will call the committee back to order, the Water and Power Subcommittee of the Committee on Energy and Natural Resources.

We were hearing the testimony of Mr. Richard Cairo whom I interrupted on the vote, and I would ask that we please proceed with his testimony.

Mr. **Cairo**. Yes, sir, Mr. Chairman. I will pick it up from the second paragraph.

Under article 14, section 14.1 of the compact, the commission adopted a comprehensive plan for the management and development of the water resources of the Susquehanna River basin. The plan, which was adopted in December 1973, and amended from time to time thereafter, sets forth goals and objectives in the areas of water quality, water supply, fish and wildlife protection, flood plain management, and recreation.

Section 3.10 of the compact charges the commission with the review and approval of certain water resources projects, including hydroelectric projects, for conformance with the comprehensive plan.

Common review considerations for hydroelectric projects would include: one, minimum flow through the project to meet instream needs of aquatic life downstream from the project; two, fish passage through the project; three, depending on the site of the project, water quality factors such as dissolved oxygen and temperature in the waters of the reservoir and in the dam tailrace; four, dam safety and impact on other uses of the pool upstream of the dam.

Most recently the commission has been involved in Federal relicensing procedures for the four large hydroelectric stations located in the lower Susquehanna River. One of the most controversial issues addressed by the commission is the practice of stopping or greatly reducing flows through the projects in order to operate in a peaking mode. This past practice has been particularly harmful at the lowermost and largest power dam on the river, the Conowingo project, where a considerable area of the riverbed downstream of the project is virtually dewatered when flows are shut down. Naturally, this dewatering places stress upon the aquatic inhabitants of this section of the river.

Another important issue in the relicensing proceedings has been the resotration and passage of migratory fish runs. With the construction of the Conowingo project in the late twenties, historical runs of important migratory fish such as the American shad were eliminated from all but the 10 miles of river lying below Conowingo.

Many of these same review considerations apply to small-scale as well as large-scale projects, though perhaps they are not of the same magnitude. For example, in a small-scale project the concern for fish passage may only focus on indigenous rather than migratory species.

Though the commission has some review concerns, it certainly does not oppose all hydrodevelopment. Hydrodevelopment is a legitimate use of water resources taking its place alongside other water resources uses in the Susquehanna basin.

The commission is committed to the beneficial use and development of water resources, but also feels that this use and development should proceed in an environmentally responsible manner.

Therefore, the commission suggests that Senate bill 1918 include safeguards that will assure protection of environmental values. Limiting use of these funds to rehabilitation of existing sites may be one method of protecting environmental values.

Another method might be to delegate power to an agency of Government to promulgate environmental protection standards for eligible loan applications.

We would suggest an agency outside of FERC such as the U.S. Department of Interior, Fish and Wildlife Service, which already has important review authority for hydrosites under the Wildlife Coordination Act.

I would like to thank the committee, the subcommittee, again for allowing us this opportunity to testify.

Senator **Murkowski**. Thank you, Mr. Cairo. I think we had a question posed for the panel, Mr. Matson, and I am wondering if any of the members would care to respond to whether or not there is any consensus on priorities for development of projects in the northeast area that can generally be agreed upon and supported by the States and the appropriate environmental agencies that would be asked to review to those projects? Is there some unanimity?

Mr. **Matson**. Senator, we don't have that list, a list similar to that, with us today. We will prepare such a suggestion for you.

Senator **Murkowski**. Is it an association effort that might be pursued or an effort of states or coordinated by State Governors or Lieutenant Governors? How do you go about putting this together?

Mr. **Matson**. I assume we will try to do it as a combination of things. We have got a 2-week grace period here, and that will preclude too much time. There are studies and, of course, as you and your staff are aware, that discuss these potential sites, but they have not been arranged, and certainly not by us, in a list of priority sites.

We will get together very quickly and take a look at that and see if we can quickly come up with a list that is acceptable to the broad region, and provide you with that.

Senator **Murkowski**. Well, in reality, here we have a bill that is sponsored by two Senators, Senator Specter and Senator Riegle. I indicated when Senator Specter and Lieutenant Governor Scranton were before the witness table that as far as expansion of some of the sites that had come before this committee previously from the standpoint of increasing the height of the dams, or increasing generating capacity, that the environmental community had generally objected. My purpose in concluding with the plea was that if you are serious that you as a group establish your priorities, and garner your support, and attempt to satisfy and respond to the environmental concerns that are going to be raised.

Then I think that the posture and impetus and initiative that is associated with your efforts will be more likely to succeed because if there is division and lack of support or lukewarm support, why that is one thing, but we have seen in the short time that I have been in Washington a significant power—I think that is a correct terminology—of the Northeast Coalition. If that coalition could get behind this type of legislation or perhaps amendments to this legislation if they are appropriate, because the need is to develop the hydropower in the Northeast, and the question of how to fund it will always be a problem. We are aware of that.

I personally feel that to anticipate substantial Federal appropriations is rather optimistic. On the other hand, I do not believe the Federal Government has a clear understanding of the potential of using the guarantees which provide leverage, and do not require appropriation. There is a measure of risk, but the risk can truly be measured, and those projects that have a relatively small risk I think deserve some consideration, and this bill provides I believe for an either/or situation and the guarantee may be the alternative.

Unfortunately, some have misunderstood, and the accounting practices of the Federal Government seem to be somewhat inconsistent on whether it is carried as a contingent liability or not, but we have all seen exceptions. We have seen SPRO go off budget which means it is a different method of accounting procedure, and there is lengthy discussion on the merits and a general lack of understanding of what really is being done. In any event, I would leave you with a plea to garner your forces and establish your priorities because I think what you are doing is certainly in the best interests of the area that you collectively and individually represent. It is certainly in the best interests of consumers, and certainly in the best interests ultimately of the environmental community which I think has an obligation to come up with alternatives rather than to just keep saying no to virtually every development proposal that is initiated, and I would certainly encourage that.

I don't want my remarks to be misunderstood. I consider myself a conservationist, but am aware of the reality associated with that in the real world, and we have an environmental and ecological responsibility, but I think that we have to search out for alternatives and in this case there are alternatives. There are renewable alternatives that can be multiple use benefits gained from the development of hydro.

The TVA, you only have to go down to Tennessee and see what that has done to that country, and it is true there were a different set of circumstances prevailing at that time, but by the same token, there has been substantial resulting benefit.

I thank you for your testimony, and we will be looking forward to seeing you collectively or individually again before the committee, and I told Mr. Brown to see to it.

We wish you a good day.

Mr. **Matson**. Thank you, Mr. Chairman.

[Whereupon, at 12 noon, the hearing was adjourned.]

APPENDIX

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

DELAWARE RIVER BASIN COMMISSION
P.O. BOX 7360
WEST TRENTON, NEW JERSEY 08628

(609) 883-9500

July 28, 1982

Dear Mr. Chairman:

This concerns S. 1918 regarding the proposed "Northeast-Midwest States Federal Hydropower Financing Authority Act."

The Delaware River Basin Commission (DRBC) is a Federal-interstate compact agency created in 1961 by common legislation enacted by the Congress and the legislatures of the four basin states -- Delaware, New Jersey, New York and Pennsylvania.

Article 9 of the DRBC Compact which, of course, is Federal law, relates to DRBC's authority in hydroelectric power and hydroelectric energy development and sales. However, the marketing of hydropower/energy by the DRBC is limited to "wholesale marketing" - not retail.

It would be very much appreciated if S. 1918 could be revised to reflect DRBC's authority to develop and market such energy wholesale, so that we would be eligible for any loans available under S. 1918.

Following are slightly revised sections of S. 1918 which would accomplish that end:

> Sec. 6. (a) Subject to the provisions of subsection (b), the Corporation is authorized, on such terms and conditions as the board of directors may prescribe, to make loans to member States, including political subdivisions thereof which are engaged in retail electric services, and power authorities of member States, rural electric cooperatives, /interstate compact river commissions, and/ consumer-owned and stockholder-owned electric utilities which provide retail electric service, *and Federal-interstate compact river basin commissions which have the authority to develop and market wholesale electric power,* located within any State which is a member of the Authority for the purpose of enabling such State, subdivision, cooperative, commission, or utility to carry out hydropower development.

Sec. 7. (a) (1) Subject to the limitations set forth in paragraph (2), the Corporation is authorized, on such terms and conditions (including the right of subrogation) as the Board of Directors may prescribe, to commit to, or enter into loan guarantees against loss of principal and interest on bonds, notes, or other obligations (including refinancing thereof) issued solely to provide funds to any member State, including political subdivisions thereof which are engaged in retail electrical services, and to any power authorities of member States, rural electric cooperatives, /interstate compact river commissions, and/ consumer-owned and stockholder-owned electric utilities which provide retail electric services*, and Federal-interstate compact river basin commissions which have the authority to develop and market wholesale electric power,* located within any State which is eligible to participate in the Authority for the purpose of enabling such State, subdivision, cooperative, commission, or utility to carry out hydropower development projects.

The DRBC has pending a license application with the Federal Energy Regulatory Commission to develop low head hydroelectric energy at the Blue Marsh Reservoir in Pennsylvania. It has been found economically feasible and has a very favorable benefit-cost ratio. Certainly, enactment of S. 1918 would provide an excellent vehicle to at least partially finance development of this project, provided that S. 1918 was to be modified as suggested above.

Often, northeastern and midwestern states have not benefited to the degree of western states in water resources development. The bill, S. 1918, is certainly one positive approach to close that gap, as well as promote the development of lower cost energy for our national well-being.

Thank you very much for the opportunity to submit this letter for the hearing record on S. 1918.

Sincerely,

Jerry Hansler

Gerald M. Hansler

Honorable Frank H. Murkowski, Chairman
Senate Subcommittee on Water and Power
Committee on Energy and Natural Resources
United States Senate
Washington, D. C. 20510

Copies sent to attached list.

Subcommittee Members:

Honorable Bill Bradley
Honorable Wendell H. Ford
Honorable Mark O. Hatfield
Honorable John Melcher
Honorable Donald L. Nickles
Honorable Paul E. Tsongas
Honorable Malcolm Wallop
Honorable Lowell P. Weicker

Honorable John Heinz
Honorable Arlen Specter

IOWA ASSOCIATION
OF ELECTRIC COOPERATIVES

8525 DOUGLAS AVE., — SUITE 48 — URBANDALE, IOWA 50322 — 515-278-5350

July 27, 1982

Honorable Frank H. Murkowski, Chairman
Subcommittee on Water and Power
Committee on Energy & Natural Resources
United States Senate
Room 2104, Dirksen Office Bldg.
Washington, D.C. 20510

Dear Senator Murkowski:

Those of us who live along major rivers have felt their potential as renewable energy sources have not been fully developed.

Although the Missouri River has been partially harnessed, nothing has been done east of it on the Mississippi and others.

S. 1918 is a step in the direction of starting the country and people of the area developing hydro energy.

Mr. Matson, President of Great Lakes Electric Consumer Association, I believe captured our feelings on the need to move forward with joint Government, Municipal and Cooperative participation in developing this hydro energy.

Sincerely,

Glenn O. Lovig
Exec. Vice President

cc: Bill Matson
Frank Frisk

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
ENERGY ADMINISTRATION
TAWES STATE OFFICE BUILDING
ANNAPOLIS 21401
(301) 269-2261

August 26, 1982

The Honorable Frank H. Murkowski, Chairman
Subcommittee on Water and Power
Committere on Energy and Natural Resources
U.S. Senate
Washington, DC 20510

Dear Chairman Murkowski:

Governor Hughes asked me to respond to your letter to him, dated July 2, 1982, requesting comments on S. 1918, a bill to establish the Northeast - Midwest States Federal Hydropower Financing Authority. Maryland supports the goal of S. 1918 to encourage the development of renewable resources such as hydropower. However, we also realize that the commitment of Federal funds to new programs must be weighed carefully, in view of the needs of other programs and the current state of the Federal budget. We wish to suggest a number of amendments for consideration during your deliberations on S. 1918, as follows:

1. It should be made clear that Maryland is eligible to participate in the proposed Authority.
2. It should be made clear that pumped storage hydropower projects are eligible for financing through the proposed Authority, as well as run-of-river hydropower projects. However, the study of hydroelectric power potential provided for in Section 10 of the legislation need only address run-of-the-river projects.
3. Public instrumentalities of a State, corporations, partnerships, and sole proprietorships should be added to the list of organizations eligible for financing. This would facilitate the development of small-scale hydropower facilities.
4. It should be made clear that, although the Authority is only authorized to provide loans or loan guarantees for up to 70 per cent of the initial total estimated project cost, financing for the balance of the project cost may be provided by State or private financing entities.

5. In its decisions on awards of financial assistance, the Authority should be required to ensure that adequate consideration and protection are given to fish, aquatic life, and wildlife; recreational purposes; and the withdrawal of water for public water supply, agricultural, industrial, and other purposes during the planning, construction, and operation of hydroelectric facilities. The legislation should authorize the Authority to delegate these responsibilities to the States.

We appreciate the opportunity to provide these comments. Please contact me if you have any questions.

Very truly yours,

Paul Massicot

Paul Massicot

PM:ph

cc: Governor Hughes
Secretary Coulter

Minnesota
municipal utilities association
P.O. Box 459, 401 East Hwy. 55, Buffalo, Minnesota 55313 Phone: 612/682-4104

August 2, 1982

The Honorable Frank H. Murkowski, Chairman
Subcommittee on Water & Power
Committee on Energy & Natural Resources
United States Senate
Room 2104 / Dirksen Office Bldg.
Washington, D.C. 20510

Dear Senator Murkowski:

I am writing you concerning Senate Bill #1918 authored by Senator Arlen Specter and concerns hydroelectric development financing.

Without going into great detail, I would like to convey to the committee that the members of the Minnesota Municipal Utilities Association supports the position of the Great Lakes Electric Consumers Association (GLECA) as expressed before the subcommittee in testimony by the President of GLECA, William F. Matson.

The Minnesota Municipal Utilities Association represents the 129 municipally owned and operated electric utilities in the State of Minnesota and was one of the founders of GLECA. We recognize the particularly important role that federal development of hydropower can play in the economic and social welfare of a region in that the western part of the State of Minnesota has long been served by the Western Area Power Administration with federal hydropower from the Missouri River System.

They are represented by GLECA, together with the northeast, and has for too long been the only major national geographic area not served by federally developed and marketed hydropower and this situation should be readdressed.

I urge that the subcommittee give every consideration to Senate Bill #1918, taking into consideration that while the bill is not perfect, it represents an important start to the development of this important resource.

Respectfully yours,

R G Kirkham

R. G. Kirkham
Executive Director

RGK/dev
GLECA-1/105

cc: Senator Durenberger
Senator Boschwitz
William F. Matson, President - GLECA
Alex Radin, Exec. Dir. - APPA

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HOUSE OF REPRESENTATIVES
COMMONWEALTH OF PENNSYLVANIA
HARRISBURG

COMMITTEES

FEDERAL-STATE RELATIONS, CHAIRMAN
APPROPRIATIONS
LIQUOR CONTROL

August 2, 1982

Honorable Frank H. Murkowski
Chairman, Energy and Natural Resources Committee
2104 Dirksen Building
Washington, D.C. 20510

Dear Senator Murkowski:

I have recently been contacted by Representative Karl W. Boyes concerning the fact that your Committee scheduled a Water and Power Subcommittee hearing on July 29, 1982 for the purpose of considering legislation which has been introduces by United States Senator Arlen Spector which would help the Northeast and Midwest states in the United States to obtain federal assistance for developing hydroelectric generating facilities.

For your information, there has been similar legislation drafted in the Pennsylvania State House of Representatives, House Resolution 206, which has been referred to the House Federal-State Relations Committee, which I Chair, where it is awaiting consideration.

Please be assured that when the Pennsylvania State House of Representatives reconvenes session in September that I plan to call this particular legislation up for consideration by the Committee. In the meantime, your continued efforts on this issue in Washington would certainly be appreciated.

Sincerely,

GEORGE C. HASAY, Chairman
Federal-State Relations Committee

GCH:brz

PP&L Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

Robert K. Campbell
President
215 / 770-5947

August 12, 1982

Senator Frank Murkowski
Committee on Energy and Natural Resources
Subcommittee on Water & Power
3104 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Chairman Murkowski:

Thank you for the opportunity to comment on S 1918, to establish the Northeast-Midwest States Federal Hydropower Financing Authority.

Pennsylvania Power and Light Company (PP&L) fully supports hydroelectric power development in the Northeast as a valuable alternate energy source. PP&L has instituted a Pioneer Rate for the purchase of energy from small hydropower projects, as well as other renewable energy alternatives to encourage their development. Not withstanding this effort, and other inducements provided by the Public Utility Regulatory Policies Act, large capital requirements and high interest rates remain as impediments to the development of some small-scale hydropower and other alternate energy sources.

Small-scale hydropower, while technically feasible and offering low cost operation, often requires higher capital investment per kilowatt than conventional fossil fuel alternatives. The future of small-scale hydropower projects is dependent on efforts to minimize the cost of mechanical equipment and associated civil works. Industry has made important strides toward this goal by developing standardized equipment packages. The development of bulb and tubular turbines has enhanced the feasibility of such projects. A considerable degree of sophistication has been attained, and research continues to explore innovative cost saving approaches.

The Department of Energy, equipment manufacturers, and the electric utility industry are all contributing to these research efforts. The Electric Power Research Institute (EPRI) is currently exploring a more widespread application of hydraulic pumps operating as turbines to generate electricity, as well as the use of siphon penstocks as opposed to conventional civil intake structures. Both measures may promote additional cost savings which cannot now be realized. With advancements such as these, sites which today appear uneconomical may in the future be worthy of development.

The electric utility industry and the public and private sectors interested in hydropower development are all facing investment indecision primarily due to high interest financing. Relief is required to encourage full development of our renewable resources. Efforts such as S 1918 should serve this end.

Sincerely,

Robert K. Campbell

cc: Senator Arlen Specter

PENNSYLVANIA PUBLIC UTILITY COMMISSION
COMMONWEALTH OF PENNSYLVANIA
P O BOX 3265
HARRISBURG PENNSYLVANIA 17120

SUSAN M. SHANAMAN
CHAIRMAN

1982 JUL 29 PM 12:19

July 27, 1982

The Honorable Arlen Specter
Member, U.S. Senate
342 Russell Building
Washington, D.C. 20510

Dear Senator Specter:

Thank you for your courtesy in asking me to testify before the Subcommittee on Water and Power regarding your proposed legislation Senate Bill 1918, Northeast-Midwest States Federal Hydropower Financing Authority Act.

Due to a commitment to the National Association of Regulatory Utility Commissioners, I will not be able to present direct testimony. Therefore, I respectfully request that the information given in the following text be introduced into the recorded remarks of the hearing.

The Pennsylvania Public Utility Commission supports both the public and private development of small scale hydroelectric power in the Commonwealth and the nation. The Commission believes that if this development is prudently planned and financed, it will reduce the use of finite energy sources, benefit our citizens, and add to the economy of our state and country.

A composite site inventory of potential hydropower dams in the Commonwealth shows 108 possible projects with dams ranging from 234 to 8 feet. These sites, if fully developed, could generate a maximum estimated 5 billion kwh per year. This in turn would save approximately 2,800,000 barrels of #6 residual fuel oil per year.

The Commission's activities in small scale hydroelectric development began with the passage of the Public Utility Regulatory Policies Act of 1978 (PURPA). Section 210 of the Act mandates states to promulgate the necessary regulations requiring the electrical utilities to purchase the power produced by small power producers, at a just and reasonable price.

To encourage small scale hydro development, the Commission held the first of two small scale hydroelectric conferences at Carlisle, Pennsylvania, in September 1979. This meeting brought together state agencies, the Federal Energy Regulatory Commission (FERC), Department of Energy, the Corps of Engineers and many private parties. Over 200 people attended. As a follow-up, the Commission sponsored a joint conference with the Department of Energy in May 1981. Over 192 people attended. This one dealt primarily with revised FERC regulations as they relate to PURPA 210 and project financing, which has developed into a major stumbling block in both the public and private sectors.

In addition, the Commission has worked closely with the Pennsylvania Department of Environmental Resources and the Legislature in supporting state legislation which would enhance small scale hydro development. We have supported bills giving first and second class townships authority to "construct or purchase facilities for the purpose of manufacturing electricity by hydroelectric generation." We have also supported Senate Bill 69 and House Bill 681 which are designed to promote the improvement of existing hydroelectric projects and assist in developing new ones by creating a Hydroelectric Authority. We also support House Bill 2055 which among other purposes encourages the development of hydroelectric facilities in the Commonwealth through the cooperation between state agencies, municipalities, municipal authorities, rural electric cooperatives and private enterprise.

Within the terms of the Pennsylvania Public Utility Law, we will continue to assist any organization, individual entrepreneur, or local government body in the initial phases of site development, and our technical staff will act in an advisory capacity in negotiations with public utilities under our jurisdiction.

As mentioned before, the Commission has determined that one of the major road blocks to hydroelectric development at both the public and private level is financing. Your legislation, Senate Bill 1918, would be a giant step toward assisting development and would certainly add to the economy of the state and nation.

The Pennsylvania Public Utility Commission strongly supports S. 1918 and respectfully recommends that the Subcommittee on Water and Power approve this constructive legislation.

Sincerely,

SM Shanaman

SUSAN M. SHANAMAN
Chairman

SMS/ksb

Enclosure

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
P. O. BOX 3265, HARRISBURG, Pa 17120

IN REPLY PLEASE
REFER TO OUR FILE

SECOND STATUS REPORT - SMALL SCALE HYDRO (SSH) DEVELOPMENT

Dear Sir or Madam:

Under the Public Utility Regulatory Policies Act of 1978, Title II, Section 210 and Title IV, the Commission has the responsibility to assure that small power producers and cogenerators receive a just and reasonable rate for the sale and purchase of electrical energy from the utilities under the Commission's jurisdiction. In conjunction with our efforts to carry out this responsibility, the Commission has set up a small scale hydro project status report to be published semi-annually. Since you have an active interest in small scale hydro development, we would appreciate your keeping us advised of significant developments on any project in which you have an interest. We would also appreciate your giving us the name of the engineering firm or consultant involved in your projects. We are trying to develop an impartial referral list for future developers.

With this information we will be able to track the progress of SSH development in Pennsylvania more accurately and also provide other developers with your innovative ideas. Information should be sent to Frank Pilling or Thomas Clift at the Public Utility Commission (P.O. Box 3265, Harrisburg, PA, 17120) or can be telephoned in by calling 717-787-6476. If you are not already receiving this report directly and would be interested in receiving future editions, please fill out the form at the bottom of this page and return it to the address shown below.

Conrad J. Six
Director, Bureau of Conservation
Economics & Energy Planning
Public Utility Commission

- -

Return to: Pennsylvania Public Utility Commission
Bureau of Conservation, Economics & Energy Planning
P.O. Box 3265
Harrisburg, PA 17120

Name____

Organization______________________________________

Address____

City/State/Zip____________________________________

STATUS OF SMALL SCALE HYDROELECTRIC DEVELOPMENT IN THE COMMONWEALTH

APRIL 1982

This report was prepared by the Bureau of CEEP. Any questions or comments on the report should be directed to Frank Pilling. or Tom Clift (717) 787-6476. Information is as up to date as our sources will allow. If you have any corrections, please advise the writer.

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
P O BOX 3265. HARRISBURG. Pa 17120

May 26, 1982

IN REPLY PLEASE
REFER TO OUR FILE

Dear Sir or Madam:

It has been brought to our attention that there are some minor discrepancies in our Second Status Report - Small Scale Hydro (SSH) Development Report, April 1982.

Corrections are listed below:

1. Page 2 Allegheny Electric Coop
   a) Emsworth is a lock dam.
   b) A license application for Raystown was submitted March 31, 1980.
   c) License applications for Allegheny L/Ds 8&9 will be filed in May 1982.
2. Page 2 Fairmount Dam Capacity should read 3,600 KW.
3. Appendix I Page 1
   a) Conemaugh - Estimated KW should read 14,000.
   b) Octoraro should be Chester Water Authority.
4. Appendix II Page 1
   a) L/D 5 should read project #3071.
   b) Emsworth should read project #2945.
5. Appendix II Page 2
   a) Fairmount should read 3,600 KW.
   b) Monongahela L/D4 should read project #4033.
   c) Raystown Estimated KW should read 22,000. Project should be placed at Appendix I, Page 1.
6. Appendix III Page 1 - L/D 4 should show as under litigation.

FERC has advised us of a new publication entitled "Application for Hydropower Licenses, Exemptions and Preliminary Permits." It is referred to as the BLUE BOOK (FERC 0097). To order, see the address below. Cost is $7.50, payable by check or money order only, to Department of Energy.

Contact: Ms. Cinda Olga (Telephone: (202) 357-8055)
Division of Public Information
Federal Energy Commission, Room 2214
825 North Capital Street, NE
Washington, D.C. 20426

Frank B. Pilling

Frank B. Pilling
Bureau of Conservation,
Economics & Energy Planning
PA Public Utility Commission

INTRODUCTION

This report is the second of what will be a series of semi-annual reports on the status of small scale hydroelectric (SSH) development in Pennsylvania. Its purpose is to provide an updated summary of SSH activities.

Since our October 1981 report many changes have taken place. Numerous permits have been issued; licensing and exemption documents have been filed with FERC; and some permits have been surrendered. These actions are shown in Appendix I. Appendix II is an updated list of permits granted and Appendix II is a list of permits applied for.

As an added feature Appendix IV shows some of the dam sites which are being studied or developed. If you have a small 4 x 5 or 5 x 7 photograph of your site, we would like to have a copy for our records and future listing in a status report.

STATUS OF PURPA 210 REGULATIONS

The initial proposed regulations to implement Section 210 of PURPA were published in the Pa. Bulletin June 6, 1981. Extensive comments were filed and evidentiary hearings were held on October 13, 14, 27, 28 and 29, 1981.

After careful consideration of the initial comments, testimony, briefs and transcripts (900 pages) from utilities, state agencies, prospective developers and other interested cogenerators, Staff made certain revisions and additions to the proposed regulations and distributed same to all parties of record with comments due March 8, 1982.

Following review of the second set of comments, Staff plans to submit the final proposed regulations to the Commission for adoption during May, 1982.

LEGISLATIVE DEVELOPMENTS

Act 33 and Act 44 were signed into law by the Governor in February, 1982. Basically these two acts allow first and second class townships to "construct or purchase facilities for the purpose of manufacturing electricity by hydroelectric generation."

House Bill 681 and Senate Bill 69 creating a Hydroelectric Authority have been tabled for this legislative session.

House Bill 682 which deals with tax exemption for certain hydroelectric facilities has also been tabled for this legislative session.

Additional legislation relating to energy is in the formative stages and will be reported on at a later date.

STATUS OF SPECIFIC DAM SITES

Allegheny Electric Coop. They have preliminary permits on four major dams: Allegheny River Lock and Dam (L/D) 8 and 9, and the Raystown and Emsworth flood control dams. All four projects are in the final stages of the feasibility studies with L/D's 8 & 9 the furthest along. The Coop planned to apply for licenses on these two projects in May 1982.

Conemaugh Dam. This C of E, 137 foot, 10 MW, flood control dam is at the stage of development and financing where the developers are applying for their FERC license even though they have not yet negotiated a power purchase contract with the utility, Pennsylvania Electric. Their time frame, barring any unforeseen problems, is to start construction in 1982 and be operational by late 1984 or early 1985.

Cowanesque. This permit has been reissued after two protests were denied, and a feasibility study is being initiated.

Crooked Creek. The prefeasibility study is completed and a license application is being prepared.

East Branch. A license application is being prepared.

Eastvale-Townsend. In October 1981 this combined site project received a $54,000 DOE loan for a feasibility/design study. As a result of the study the combined feasible capacity has been reduced from 10,000 KW to 6,500. Eastvale - 2,500, Townsend - 4,000. The major problem now is financing.

Fairmont Dam. This 32 foot concrete dam with an estimated capacity of 8600 KW is the first of a series of dams upriver from the mouth of the Schuylkill River in Philadelphia. It is owned by the city and supports the only experimental fish ladder in the state. Their budgeted $75,000 feasibility study is well underway and should be completed by late May 1982.

Flat Rock. A license application for this 12 foot 3,500 KW project to be located on a Department of Environmental Resources dam was filed February 22, 1981. At present the subject of instream flow has not been resolved with the U.S. Fish & Wildlife Service and the PA Fish Commission, but a mutually satisfactory solution is expected in the near future.

Musser Dam. American Hydro Power Co. is awaiting issuance of a Minor License from the Federal Energy Regulation Commission for the Mussers Dam Project located on Middle Creek just south of Selinsgrove, Pennsylvania. The public notice period ended on February 22, 1982. The project will have an installed capacity of 350 KW and produce approximately 1.4 million kilowatt hours/year. Development at the site will involve use of the existing dam and powerhouse and the installation of new electrical generating equipment. An existing turbine will be refurbished. Power produced at the site will be sold to Pennsylvania Power and Light. The dam is owned by the Pennsylvania Fish Commission and they will receive a royalty based on the gross revenues received from the sale of the power. The site has a 20 foot head and an average mean flow of 256 cfs. The site last produced power in 1954.

Oakland Dam. In November of 1981 American Hydro Power Co. entered into a Lease Agreement for the Oakland Dam and powerhouse. The owner of the site, River Bounty, Inc., is a nonprofit organization made up of the Borough of Oakland, the Borough of Susquehanna, and the Barnes-Kasson Hospital. An application for license exemption has been filed with the Federal Energy Regulatory Commission. The site is located on the Susquehanna River and has a head of 12.5 foot and an average yearly flow of 3300 cfs. Development of the site will include use of the existing dam and powerhouse as well as the installation of hydroelectric generating equipment. Plans call for the installation of 1 MW which will produce 5 million KW hours per year. Power will be sold to Penelec. The site last produced power in 1966. Application for exemption was filed April 5, 1982.

Octoraro. This 62 foot dam owned by the Chester Water Authority will produce 500 KW maximum and the power will be used to operate the waterworks. It is estimated to save them 25% of their annual electrical bill which will average out to $250,000 at current rates. The final cost benefit ratio after accommodating all flow restriction came out to an amazing 1.75.

Ontelaunee Dam. The City of Reading owns this 55 foot dam and based on its final feasibility study hopes to reduce its water pumping bill by $263,000 per year.

Tionesta. A feasibility study continues on this 145 foot C of E dam. Preliminary negotiations with the utility involved are just getting under way.

Union Mills. This will be a run-of-the river project located outside of New Hope, PA and spanning the Delaware with 420 foot gap in the center of the dam. It will produce 6,000 KW from ten (10) 600 KW generators located in the old mill on the West Shore. Peter Cross, the owner, applied for a license on March 29, 1982 and states that barring any major set backs he could have the project on line by 1984.

Frances E. Walters Dam. This 234 foot C of E flood control dam is undergoing an advanced engineering design study to increase its size and development as a reservoir. The Borough of Weatherly received a $46,400 feasibility loan to integrate a 2,400 KW hydro unit into the dam conversion plans. The study is in its second phase of study and is being coordinated with the Corps.

Youghiogheny Dam. The Borough of Seven Springs is conducting a feasibility study with a loan of $45,000 from DER. They estimate the study will be completed by July by which time they will have worked out most of the environmental problems involved which will be minimal as they plan a run of the river project. This is a 184 foot C of E Dam.

We encourage developers to send us any pertinent information on their sites, including a 5 x 7 photograph. The information will be used to assist others and will be included in future and possible supplementary reports.

BEST DOCUMENT AVAILABLE

APPENDIX I

LICENSING AND SURRENDER ACTIONS AS OF APRIL 1982

Licenses Applied For:

Dam	River/Creek	Owner	Ht. Ft.	Est Kw	Applicant	Project #	Date Filed	Utility Service Area
L/D 8	Allegheny	C of E	18	13,000	Allegheny Elec. Coop.	3021	To file Spring 1982.	W. Penn Power
L/D 9	Alleheny	C of E	22	17,000	Allegheny Elec. Coop.	3022	To file Spring 1982.	W. Penn Power
Auburn	Schuylkill	DER	10	1,000	PA Hydro Corp.	2803	Dec 1981	PP&L
Conemaugh	Conemaugh Cr.	C of E	137	5,000	PA Renewable Res. - Boro of Saltzburg	3207	Sep 9, 1981	Penelec
Laston/ Rauhsville	Lehigh	DER	30	3,500	PA Hydro Corp.	2803	Dec. 1981	PP&L
Felix	Schuylkill	DER	17	1,300	PA Hydro Corp.	2803	Dec. 1981	Met Ed
Flatrock	Schuylkill	DER	12	3,500	PA Hydro Corp.	2803	Dec. 1981	Phila. Electric
Musser	Middle Creek	PA Fish Commission	31	350	AM Hydropower Co	3706	Dec. 15, 1981 (Minor).	PP&L
New Kerns-ville	Schuylkill	DER	19	1,000	PA Hydro Corp.	2803	Dec. 1981	Met Ed
Union Mills	Delaware	Peter Cross	R of R	6,000	Ridgeway Marine	5078	March 1982	Phila. Electric
License Exemptions Applied For:								
Oakland	Susquehanna	Boro of Oakland	12	1,600	Am. Hydropower Co.	5730	Apr. 5, 1982	Penelec
Patterson	Beaver	Beaver Valley Power	17	3,000	Beaver Valley Power	3519	May 20, 1981	Duquense
License Exemptions Approved:								
Octoraro (Pine Grove)	Octoraro CR.	Chester Co. Water Auth.	62	508	Chester Water Authority	3498	March 26, 1982	Phila. Elec.
			TOTAL	55,758				

LICENSING AND SURRENDER ACTIONS AS OF APRIL 1982

Permits Surrendered:

Dam	River/Creek	Owner	Ht. Ft.	Est Kw	Applicant	Project #	Date Filed	Utility Service Area
Alvin R. Bush	Kettle Cr	C of E	165	4,500	Hydro Corp. of PA	3289		
Curwinsville	W. Br. Susque. R.	C of E	131	5,700	Hydro Corp. of PA	3327		
Monongahela L/D 2	Monongahela R.	C of E	8	6,700	Central City	3752		
Tioga-Hammond	Crooked Cr	C of E	89	2,900	Hydro Corp. of PA	3357		
Union City	French Cr.	C of E	88	2,300	Hydro Corp. of PA	3363		
			TOTAL	22,100				

*Under Litigation
DER = Dept Environmental Resources

APPENDIX II
PA SMALL SCALE HYDROELECTRIC PRELIMINARY PERMITS ISSUED AS OF APRIL 1982

Dam	River/Creek	Owner	Ht. Ft.	Est Kw	Applicant	Project #	Date Filed	Utility Service Area
L/D 2	Allegheny	C of E	11	15,400	Borough of Central City	3667 (Under appeal).	Oct. 15, 1981	Duquesne
L/D 3	Allegheny	C of E	14	30,000	Borough of Cheswick & Allegheny Valley N. Council of Govt.	4474	Oct. 21, 1981	Duquesne
L/D 5	Allegheny	C of E	12	17,100	Borough Central City Mitchell Energy	3671 (Under appeal)	Oct. 23, 1981	W. Penn
L/D 6	Allegheny	C of E	12	17,000	Noah Corp.	3494	Oct. 26, 1981	W. Penn
L/D 7	Allegheny	C of E	13	18,900	Borough Central City	3700	Oct. 23, 1981	W. Penn
Beltsville*	Lehigh	C of E	170	2,000	Borough of Lehighton	2994	Apr. 7, 1981	PP&L
B. F. Goodrich	Perkiomen	B. F. Goodrich	18	290	Am. Hydropower Co.	3845	May 15, 1981	Phila. Elec.
Blue Marsh		C of E	96	1,400 avg.	Del. R.B.C./DER	3026	June 27, 1980	Met Ed
Chain Dam	Lehigh	DER	20	1,700	DER/City of Easton	3547	Sept, 28, 1981	Met Ed
Chestmont Project:								
Vincent	Schuylkill	DER	7	1,520	J Chain Dam Hydro,	3499	Dec. 3, 1980	Phila. Elec.
Black Rock	Schuylkill	PECO	9	1,600	O Coop. Energy Development	3501	Dec. 3, 1981	Phila. Elec.
Norristown	Schuylkill	PECO	9	2,000	I " " " "	3502	Dec. 3, 1981	Phila. Elec.
Plymouth	Schuylkill	DER	8	2,000	N " " " " T	3500	Dec. 3, 1981	Phila. Elec.
Cowanesque*	Tioga	C of E	112	2,270	Hydro Corp. of PA	3367	June 19, 1981	Penelec
Crooked Creek	Crooked Creek	C of E	143	4,750	Hydro Corp. of PA	3304	Feb. 20, 1981	W. Penn
Dashields L/D	Ohio	C of E	10	22,000	Borough Central City	3747	Sept. 30, 1981	Duquesne
E. Branch	Clarion	C of E	184	1,600	Hydro Corp. of PA	3292	Jan. 27, 1981	W. Penn
Eastvale (Townsend)	Beaver	Beaver Valley Mun. Authority	13	2,500	Beaver Valley Munc. Authority	3450	Feb. 12, 1981	Duquesne
Emsworth L/D	Ohio	C of E	18	22,000	Allegheny El. Coop	2995	Feb. 1980	Duquesne

PA SMALL SCALE HYDROELECTRIC PRELIMINARY PERMITS ISSUED AS OF APRIL 1982

Dam	River/Creek	Owner	Ht. Ft.	Est Kw	Applicant	Project #	Date Filed	Utility Service Area
Fairmount	Schuylkill	City of Phila.	32	8,600	City of Phila.	3227	May 1, 1981	Phila. Electric
Foster Sayers	Bald Eagle Cr.	C of E	100	2,471	Investigation Guidance Committee (5 twps.)	4010	March 12, 1981	W. Penn
LoyalHanna	Loyal Hanna Cr.	C of E	47	1,500	Twp. of Conemaugh	3387	Sept. 24, 1981	W. Penn
Mahoning	Mahoning Cr.	C of E	71	2,000	Atlantic Power Development	3228	Jan. 16, 1981	W. Penn
Maxwell L/D	Monongahela R	C of E	8	13,000±	Borough of Brownsville	3899	Sept. 29, 1981	W. Penn
Monongahela L/D 3	Monongahela R.	C of E	8	6,000	Allegheny County	4866	Sept. 28, 1981	Duquesne
Monongahela L/D 4	Monongahela R.	C of E	17	11,000±	Borough N. Charleroi	4833	Sept. 28, 1981	Duquesne
Monongahela L/D 7	Monongahela R.	C of E	15'	8,200	Atlantic Power Development	3521	Oct. 27, 1981	W. Penn
Mononghela L/D 8	Monongahela R.	C of E	19	4,600	Boro of Pt. Marion	4032	Sept. 28, 1981	W. Penn
Nockamixon	Tohickon Cr.	DER	112	300	DER	4799	Oct. 27, 1981	PP&L
Ontelaunee	Maiden Cr.	City of Reading	55	1,200	Owner	3213	Oct. 27, 1981	Met Ed
Penn Forrest	Wild Creek	Bethlehem Water Authority	111	475	Owner	3519		PP&L
Prompton	Lackawaxen	C of E	140	1,250	DRBC/DER	3027	June 18, 1980	PP&L
Pymatuning	Crawford	DER	50	350	DER	5553	Dec. 7, 1981	Penn Power
Quemahoning	Quemahoning Cr.	Bethlehem Steel	100	1,330	Am. Hydropower Co.	3690	June 3, 1981	Penelec
Raystown	Juniata River	C of E	225	30,000±	Allegheny El. Coop.Penelec	2769	March 1981	Penelec

PA SMALL SCALE HYDROELECTRIC PRELIMINARY PERMITS ISSUED AS OF APRIL 1982

Dam	River/Creek	Owner	Ht. Ft.	Est Kw	Applicant	Project #	Date Filed	Utility Service Area
Shenango	Shenango River	C of E	68	2,100±	Borough Grove City	4142	May 15, 1981	PA Power
Stevens, George B.	Sinnemahoning Cr.	DER	166	500	DER	5530	Feb. 26, 1982	W. Penn
Tionesta A.	Tionesta Cr.	C of E	154	2,500	Hydro Corp. of PA	3307	Apr. 7, 1981	Penelec
Townsend	Beaver R.	Beaver Valley Mun. Auth.	17	4,000	Owner	3451	Feb 12, 1981	Duquesne
Walters, F.E.*	Lehigh R.	C of E	234	2,400±	Borough of Weatherly	2969	Mar 18, 1981	PP&L
Youghiogheny	Youghiogheny R.	C of E	184	11,000±	Borough of Seven Springs	3523	March 23, 1981	W. Penn
			TOTAL	281,906				

NOTE: The 20 ft. high Hamilton St. Dam in Allentown on the Lehigh River is to be rebuilt by Allentown, Est. KW 2490. This will be a concrete gravity dam with hydro designed into the site FERC PN 5146 (Dec. 4, 1981).

APPENDIX III
PA SMALL SCALE HYDROELECTRIC PRELIMINARY PERMITS APPLIED FOR AS OF APRIL 1982.

Page 1 of 1

Dam	River	Owner	Ht. Ft.	Est Kw	Applicant	Project #	Date Filed	Utility Service Area
L/D 4	Allegheny	C of E	10	28,000	Enagenics	3961	Feb. 26, 1981	W. Penn
				18,100	Mitchell Energy	3666	Jan. 23, 1981	
			Average	18,000	Noah Corp.	3494	Nov. 21, 1981	
			20,816	24,000	Twp. of Harrison	4473	April 3, 1981	
				24,000	Boro of Cheswick	4474	June 15, 1981	
				12,000	Tri-Cities/Armarcus	4460	April 2, 1981	
Indian Creek	Indian Creek	Westmoreland Co. Mun. Auth	40	650	Long Lake Energy Corp.	5897	March 29, 1982	W. Penn
Little Pine	Little Pine Creek	DER	113	2,300	United Am. Hydro	4083	Aug. 14, 1981	W. Penn
				400	DER	5738	Feb. 24, 1982	West Penn
Montgomery L/D	Ohio	C of E	18	5,400	Duquesne	3219	July 11, 1980	Duquesne
			Avg. KW	5,900	Allegheny Elec. Coop	2921	Sept. 1979	
			5675	5,900	Potter Twp.	3490	Sept. 19, 1980	Under Litigation
				5,500	Ohio Edison	2988	Nov. 1979	
PA. Low Head Hydro	Wapwalopen Cr.		30	1,800	David Frey, et al	4967	Aug. 13, 1981	PP&L
		Total KW Committed		370,205			Note Permit issued March 26, 1982.	
		Permits surrendered		21,100				
		Net KW Committed		349,105				

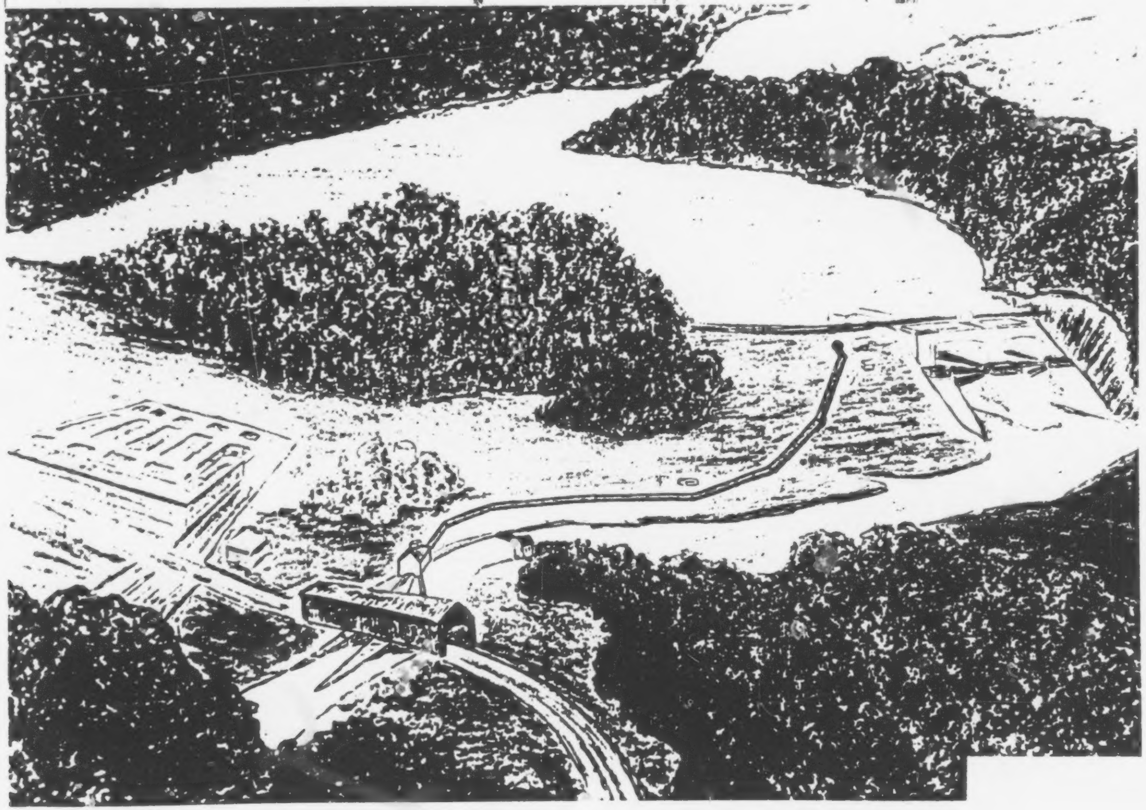
It is interesting to note that the total committed kilowatts is 55.8% of the total estimated statewide potential of 625,562 KW determined in our 1979 inventory.

66 dams are involved which is 61% of the 108 dams in our 1979 inventory.

APPENDIX IV

Some Typical Dam Sites Showing The Diversity Throughout the State

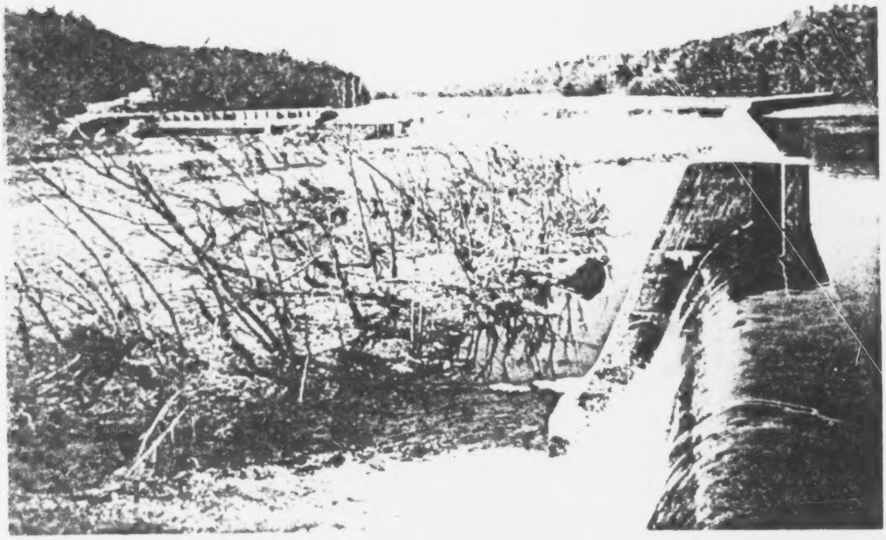
It Should Be Noted that all the Lock Dams (L/D) are located on The Allegheny, Monongahela and Ohio Rivers in Western Pennsylvania



Pine Grove
Octoraro Creek

Ht. 62 feet
Est. Power 500 KW

With a license exemption granted, a cost benefit of 1.75, and financing assured, this Chester Water Authority Project will be operational in 1984.



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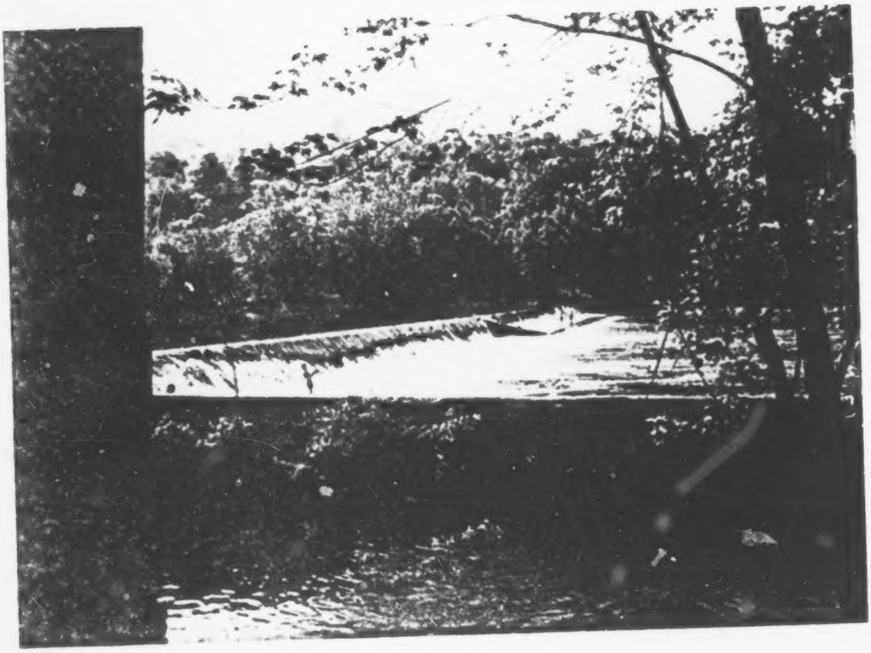
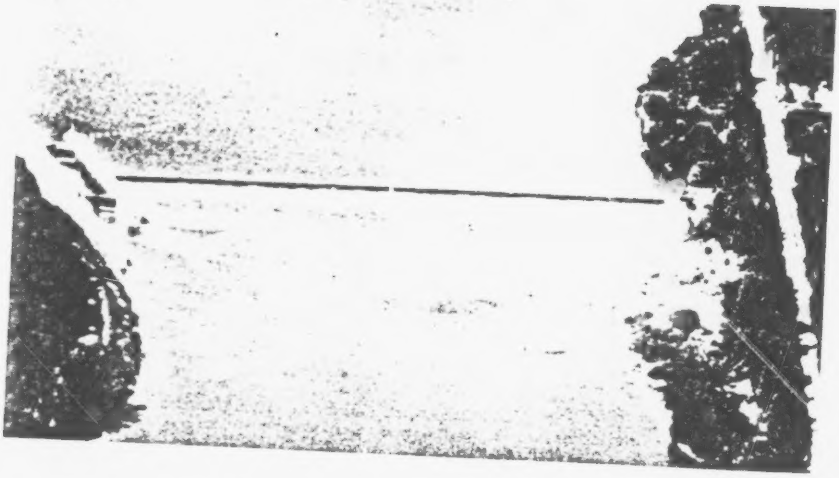
[illegible] this photo.



Oakland Dam
Upper Susquehanna River
Ht. 12 feet
Est. Power 1600 KW



[illegible] Ht. 15 feet
Est. Power 13000 KW

[illegible] on river banks. [illegible] may have to be relocated. [illegible] on many [illegible] on the Allegheny, Monongahela [illegible] Rivers.

The Delaware River: The proposed plant at New Hope would lower the water level downstream, affecting marine life negatively, but raise it upstream, thus improv

Union Mills
Delaware River

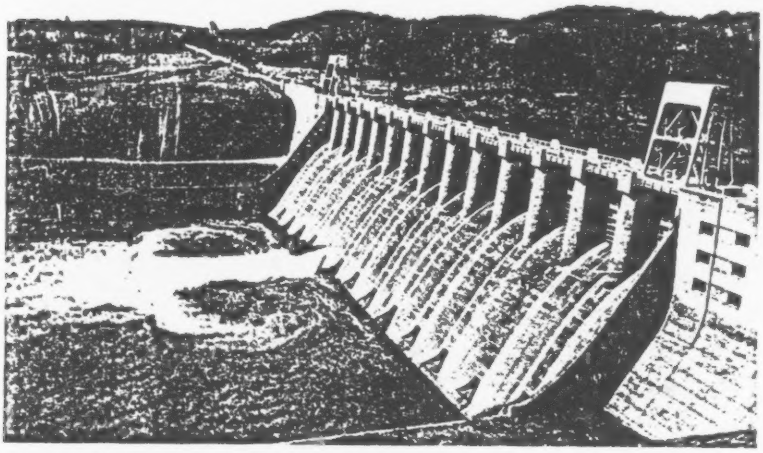
Run of River
Est. Power 6000 KW

Conemaugh River Dam Hydroelectric Project

Ht. 137 feet
Est. Power 5000 KW

Federal Energy Regulatory Commission

FERC No. 3207

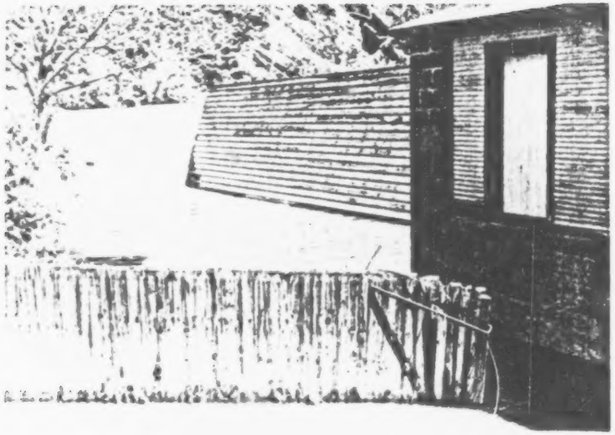


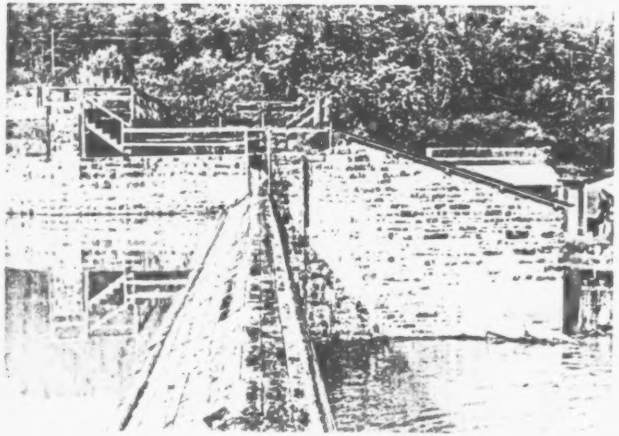
Application For License

BOROUGH OF SALTSBURG, PA.
and
PENNSYLVANIA RENEWABLE RESOURCES, INC.

JUNE 1981

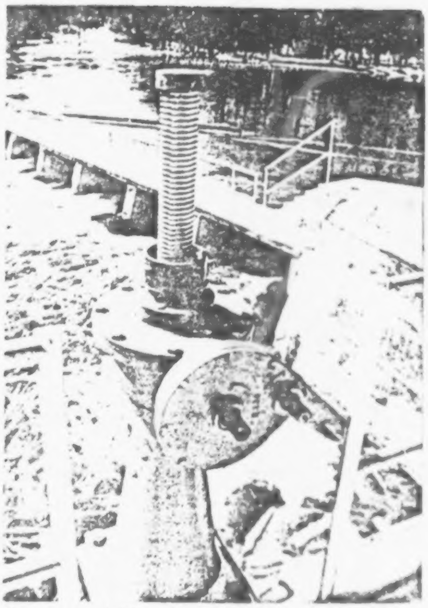
[illegible]
[illegible]
[illegible]
[illegible]





Auburn Dam
Schuylkill River
Ht. 10 feet
Est. Power 1000 KW

Easton/Raubsville
Lehigh River
Ht. 30 feet
Est. Power 3500 KW

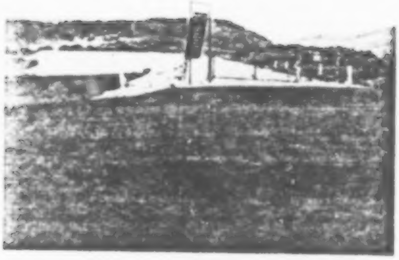


This is the site of PP&L's old hydroelectric plant on the Conodoguinet Creek in [illegible] Cumberland County. It's being studied as a possible hydro redevelopment site by the Borough of Carlisle. The device in the foreground operates the water intake gates, shutting them down for maintenance. The proposed plant would be located a short distance downstream.

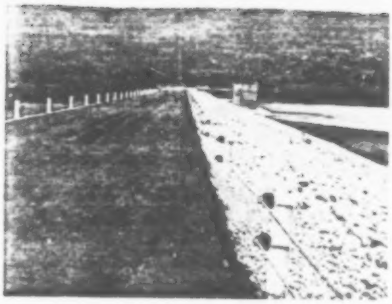
Ht. 8 feet
Est. Power [illegible] KW

Patter[illegible] Dam
Beaver [illegible]
Ht. [illegible]
Est. Power [illegible] KW

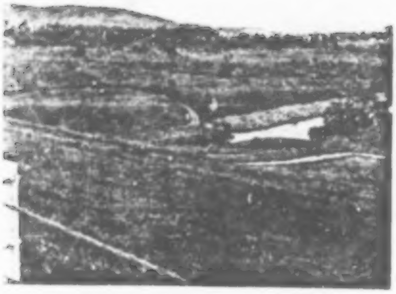
[illegible]
[illegible]
[illegible]
[illegible]



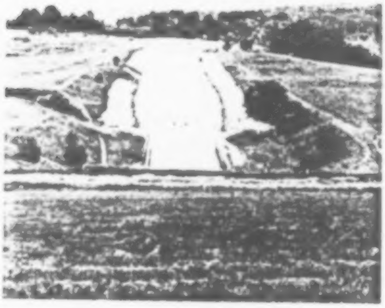
Looking west toward spillway.



ate structure right of center.



[illegible] canal [illegible] north.



Outlet canal direct view.

Private Hydroelectric Developers Active in Pennsylvania

Thomas Nolan
Atlantic Power Development
401 C St. NW
Washington, D.C. 20002

Peter McGrath
Am. Hydro Power Corp.
2 Aldwyn Center
Villanova, PA 19085

Pedro Boon
Chain Dam Hydroelectric Corp.
65 E. Elizabeth Avenue
Bethlehem, PA 18018

Continental Hydro Corp.
77 Franklin St.
Boston, Mass. 02110

Thomas H. Clarke
Enagenics
1727 Q St. NW
Washington, D.C.

Larry Gleason
Maine Hydro Electric Co.
Mill La., Box 402
Belfast, ME 04912

Bill Carter
Long Lake Energy Corporation
330 Madison Avenue
New York, NY 10017

Mitchell L. Dong
Mitchell Energy
173 Commonwealth Avenue
Boston, MA 02116

James Price,
Noah Corporation
P.O. Box 640
Aiken, SC 29801

Elizabeth Higgs
PA Hydro Corp.
Box 7319
Philadelphia, PA 19101

Jeffrey M. Kossak
PA Renewable Resources, Inc.
Suite 1930
14 Wall Street
NY, NY 10005

David Goodman
United American Hydro Group
1735 Bdwy., Suite 2404
NY, NY 10019

Peter Cross
826 Second Avenue
Center Square, PA 19427